THE IRON AGE

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Handling Parts Orders by Conveyor

Much Labor Saved by System Adopted by Packard— One Continuous Conveyor Used

BY B. R. HORSLEY

FOR 28 years the Packard Motor Car Co. has been turning out automobiles. Ample evidence could be adduced to show that the product is a long-lived car, from a survey of the very large number of old models still in use. The company has not built a truck in over eight years and yet not a day passes without several parts orders arriving for service on Packard trucks.

A corollary to the large number of old models still in use is the necessity of a parts service department equipped to furnish promptly and economically any or all parts, materials, tools or accessories that could be required for the continued satisfactory use of any car or truck the company ever produced. Dedicated to this purpose, a modern four-story steel and concrete structure, covering an entire city block and affording 240,000 sq. ft. of floor space, has been built, to be devoted exclusively to the Service Parts Manufacturing and Merchandising Division. Operated independently of production departments, with its own executive offices occupying a portion of the second floor of the building, the service parts division is acknowledged to be one of the most modern and best equipped parts departments in the automotive industry.

About one-third of the building is occupied by the service office, stockroom, shipping and receiving departments. The other two-thirds of the building, mostly on the upper floors, is used for manufacturing and assembling all parts not used on current production cars. The stockrooms located on the lower floors house all of the smaller parts and those parts most frequently ordered. These are stored in steel bins and on steel shelves, accessible to stockroom employees.

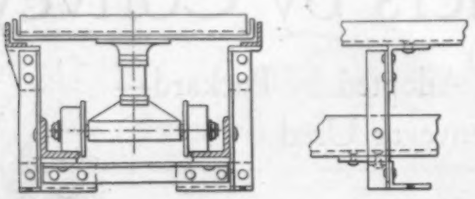
Distributing these parts from the receiving department to the various sections in which they are stored and moving them again, piece by piece, to the packing department to be assembled into multiple parts orders was a great and growing problem, requiring a steadily increasing number of employees. To minimize this handling cost and speed up the filling of multiple parts orders a continuous chain-type conveyor 827 ft. long was installed by the Palmer-Bee Co., Detroit.

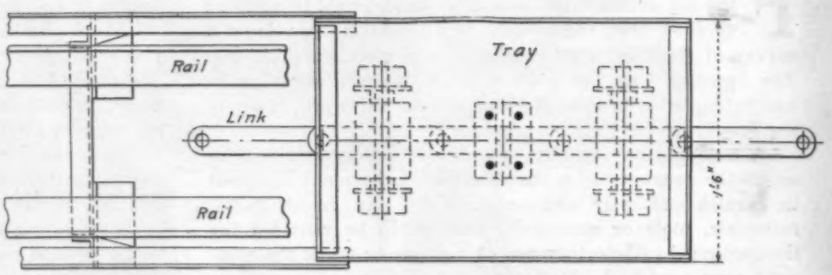
Because the conveyor follows a devious route, making

STARTING with the company 17 years ago, B. R. Horsley has been manager of the Service Parts Merchandising Division of the Packard Motor Car Co. for the past eight years. For some years he was shunted about from one section of the department to another until he had gained a wide knowledge of the workings of all of them. Thus, when a vacancy occurred at the head of the department, Mr. Horsley was prepared to fill it. He has traveled extensively for the company, studying service methods and distribution problems in practically every automotive plant in the country, in mail-order houses and other plants confronted with similar problems. He is largely responsible for the remarkably effective ordering system and conveyor assembly plan about which he writes here. Now many of the plants he visited are sending representatives to investigate the system which Mr. Horsley has helped to evolve.

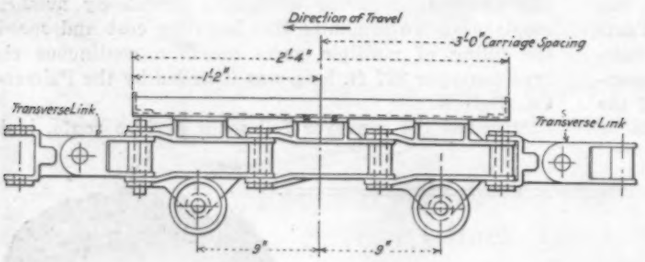
many turns, dips and rises in its course as it visits, in turn, the receiving, packing and shipping departments and every section of the parts storage department on the ground floor, it was imperative that the chain be adaptable to turning in any direction. This is accomplished by running the chain on edge, so that the regular chain joint pins permit turning in any horizontal direction, as when the chain goes around a sprocket and allows the conveyor to double back on its route in the receiving department.

At this point the heaviest loads are placed upon the trays of the conveyor, which is, therefore, only a few inches from the floor. At some points, as in the packing and checking department, where the employees work at benches, the conveyor is waist high. At other points it rises to about 7 ft. from the floor to clear aisles in which employees pass





ELEVATION (Below) of Conveyor with Tray, in the Parts Department. This shows the universal joint couplings which make possible the many turns, rises and dips along the route of the conveyor. At right is plan of conveyor without trays attached, showing tops of the vertical links in the chain, 9 in. apart, and the flanged wheels, on axles 18 in. apart. Cross-section (above) shows flanged wheels riding on steel angle tracks and angle guard rails to protect employees from the moving trays



back and forth. Transverse joints in the chain, 3 ft. apart, between adjoining trays, make possible these rising and dipping bends. The trays, of which there are 279, are 18 in. by 28 in., made of sheet steel with a 1¼-in. flange all around to prevent round pieces from rolling off. Propelled by a 5-hp. motor, the conveyor travels at the rate of 60 ft. a minute, completing a round trip in less than 15 min.

Along the route of the conveyor for the greater part of its length are steel stock bins and shelves especially adapted to carrying small quantities of the more active parts. Just back of these readily accessible bins and shelves, in rows running at right angles to the conveyor, are the larger bins and shelves where surplus stocks of material are carried. From these overflow stocks the smaller bins and shelves, closer to the conveyor, are replenished as their small stocks become depleted from the filling of orders.

When new shipments of parts and materials arrive in the receiving room they are carefully checked by receiving clerks and each lot is placed on a tray of the conveyor, with a large cardboard bearing a symbol letter which designates the section of the stockrooms to which it is destined. This enables the stockroom employees to note from a distance which of the approaching trays bear parts and materials for their respective sections. Each lot is taken from the conveyor by the employee detailed to the section in which it is to be stored and is placed in the larger surplus bins and shelves back of those closest to the conveyor.

This arrangement of carrying surplus stocks at some distance from the conveyor leaves the space along both sides of the conveyor available for the greatest possible assortment of parts in small quantities. These small stocks are not grouped together by models, as might be expected, nor are parts of a similar nature to be found close to each other in the racks and bins. It has been found advantageous to separate parts resembling each other in size and form. This reduces the possibility of errors on the part of the stockroom man. He will find a required part located among parts so different that his common sense will enable him to recognize the part wanted. The same advantage helps him to place incoming stocks where they belong, with little effort.

It is not required of the stockroom man that he be either a mechanic or a clerk. He does not check the order nor does he write the destination of the outgoing part. He can perform all his duties satisfactorily without a lead pencil. All clerical work has been taken away from him by the unique ordering system used in the division.

Parts orders, originating with the dealers, are first sent to Packard distributers, located in approximately 100 cities throughout the country. The very close relations between the dealers, the distributers and the factory have helped to bring about a simplified routine which aids materially in the prompt shipment of parts. All parts orders sent to the factory are issued by the distributers on forms furnished by the factory. These orders are set up in blocks of six copies to each order and are filled out completely in the distributer's office, eliminating delays and possible errors, which might result if the orders had to be copied at the factory. Two sizes of order forms are provided, one with six item lines for small orders, the other with 12 lines. Each set consists of the following copies of the form:

1. Service stores office—stock and shipping copy.
2. Factory service office reference copy.
3. Section copy.
4. Packing copy.
5. Acknowledgment copy.
6. Distributer's hold and reference copy.

In filling out an order the distributer furnishes the shipping destination of the parts, the incorporated or registered name of the person or company to whom the parts are to be charged, shipping instructions, amounts of each part required, parts numbers and names of parts. When completely filled out the first five copies are mailed to the factory. The sixth copy is retained by the distributer for reference and follow-up work. Upon receipt of the five copies at the factory they are time-stamped and checked for correctness.

A count of the items ordered is then made to allow for the scheduling of the order and to control the volume of

Packard

MOTOR CAR COMPANY
DETROIT, MICHIGAN

SERVICE PARTS INVOICE

REFERENCE № 181314

CHARGE TO EARLE C. ANTHONY, INC.
ADDRESS SAN FRANCISCO, CALIF.
SHIP TO SAME
ADDRESS

INVOICE NO. SK 153450
NO. PAGES 1 PAGE NO. 1
DATE OF INVOICE 8-28-28
DATE SHIPPED 8-28-28

P. PARCEL POST E. EXPRESS F. FREIGHT D. DELIVER C. CARLOAD

CODE	ORDER NO.	SHIPPED VIA AND REGISTER NO.	QUANTITY SHIPPED	PART NUMBER	MODEL SYMBOL	PREPAID CHARGES	PRICE EACH	AMOUNT	ACCOUNTS RECEIVABLE
500	03148	3150E	1-	162597B			4.20*	4.20-	G-310
500	03148	3150E	1-	162598A			4.20*	4.20-	G-311
500	03148	3150E	1-	159716B			9.00	9.00	G-314
500	03148	3150E	2-	162080C			.70	1.40	G-316
500	03148	3150E	2-	166823C			.80	1.60	G-317
500	03148	3150E	16-	158723A			.95	15.20	
500	03148	3150E	6-	158123A			7	.42	
500	03148	3150E	2-	158050B			.75	1.50	CREDIT SALES
500	03148	3150E	2-	158216B			2	4	G-307
500	03148	3150E	6-	163395B			4	.24	G-331
500	03148	3150E	2-	163479B			1.00	2.00	G-332
500	03148	3150E	4-	158648B			6.00	24.00	
							TOTAL *	63.80-	
							*	-	
							*	-	

VT & SOM

BILLING on the Above Actual Order Was Made on Hollerith Key Punch and Tabulating Equipment. These bills are made out from the original copy of the distributer's order after the parts are shipped. Bills show the date, distributer's code, his order number, amount shipped, part number, selling price and total selling price. The distributer's name and address appearing on this bill is the only typing done

UNIQUE Order Blank (Right) Used by Packard Motor Car Distributers in Ordering Parts and Sundries from the Factory in Detroit. Six copies are made out by the distributer and five are sent to the factory. One of these is cut into strips, one strip to each item on the order. The strips are distributed to the various sections of the department. An employee in each section locates the item called for on the strip reaching him and places it on the chain conveyor, together with the strip from the section copy of the order and a colored and numbered card indicating the section of the checking and packing department where the order is to be assembled. The upper left corner on the copy, where the distributer's name and address appear, is a perforated coupon which can be detached and used as mailing direction on parts small enough to be sent by parcel post

TO Packard
MOTOR CAR COMPANY
Detroit, Michigan

DISTRIBUTERS SUNDRY AND PART ORDER

To be used as Original Order Form and to confirm all telegraph, verbal or letter orders. Do not put more than twelve items on an order.

Distributer's No. D 3148 500-

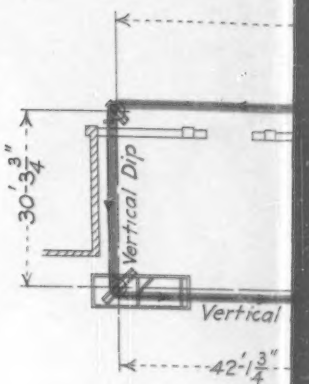
Ship to: Earle C. Anthony, Inc.
Charge to: Earle C. Anthony, Inc.
Street Address: 901 Van Ness Avenue
Address: San Francisco, Calif
City and State: San Francisco, California
Do not Abbreviate Write in Full
Ship Via: Transcontinental Frt
Date: 8-28-28
Confirming
FOR FACTORY USE ONLY

Quantity Back Order	Quantity Shipped	Quantity Ordered	Piece No.		DESCRIPTION (Always state Piece Number as given in Parts List and Noun Name)	Factory Bin Location	SELLING Each	SELLING Amount	COST
	1	1	162597	B	Front axle spring left	Comp South Hall	4.20	4.20	
	1	1	162598	a	Front axle spring right	H.L.	4.20	4.20	
	1	1	159716	B	Headlight	Top K 34	9.00	9.00	
	2	2	162080	C	Headlight door glass	J.64	.70	1.40	
	2	2	166823	C	Headlight door glass	H.L.	.80	1.60	
	16	16	158723	a	Motor camshaft rocker lever assembly	H-J-32	.95	15.20	
	6	6	158123	a	Motor camshaft rocker lever housing gasket	B 1162	.07	42	
	2	2	158050	B	Motor camshaft rocker lever pin	S-T-3-9	.75	150	
	2	2	158216	B	Motor camshaft rocker lever spring	S-H-7-4	.02	.04	
	6	6	163395	B	Motor carburetor gasket	S-V-2-8	.04	.24	
	2	2	163479	B	Motor carburetor spray tube assembly	H.L.	1.00	2.00	
	4	4	158648	B	Motor connecting rod and bushing left assembly	H.L.	6.00	24.00	

2773 6380

Checked By VTS 109
Packed By VTS 121
PLS. 45
PKGS
CRATES
BOXES
Signed J. H. Clark

FORM D-18 SERVICE STORES OFFICE STOCK AND SHIPPING COPY



LAYO
Spr
articulat

LOCATION N J 32

CARD No.	NET PRICE	COST PRICE
3	95	

	NO. USED PARTS ORDER	ASSEMBLY	BACK ORDER
SEP			
OCT			
NOV			
DEC			
JAN.			
FEB.			
MAR	2434		
APR	2253		
MAY	2067		
JUN	3029		
JUL.	3292		
AUG	421		8-15
SEP			
OCT			
NOV			
DEC.			
JAN.			
FEB.			
MAR			
APR.			
MAY			
JUN			
JUL.			
AUG			

DATE	SHIPPER NO.	DISP.	STOCK BAL. ON HAND
			7-1

NEW PARTS RETURN PT

RENCE № 181314

153450

PAGE NO. 1

8-28-28
8-28-28

AMOUNT	ACCOUNTS RECEIVABLE
4.20 -	
4.20 -	G-310
9.00	
1.40	G-311
1.60	
15.20	G-314
.42	
1.50	G-316
4	
.24	G-317
2.00	
24.00	
63.80 -	
-	CREDIT SALES
-	G-307
	G-331
	G-332

ER

bal or letter

no.

r

ntal Frt

Distributer's No.

D 3148

500-

8-28-28

Date

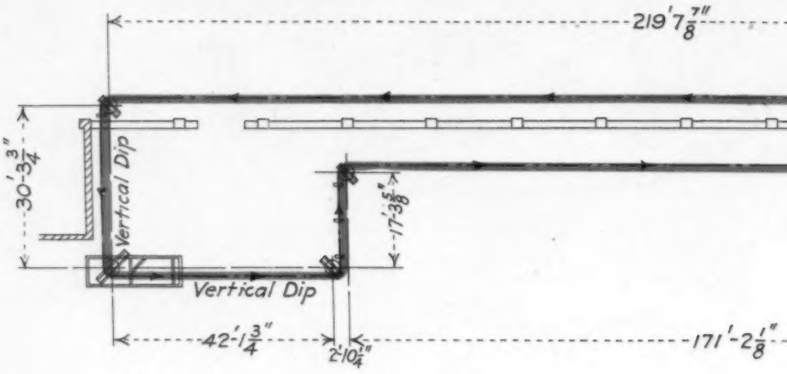
Confirming

FOR FACTORY USE ONLY

Factory Bin Location	SELLING Each	SELLING Amount	COST
Comp			
South Wall	4.20	4.20	
N.L.	4.20	4.20	
Top K-34	9.00	9.00	
J.64	.70	1.40	
N L.	.80	1.60	
N-J-32	.95	15.20	
B 1162	.07	4.2	
S-T-3-9	.75	15	
S-H-7-4	.02	.04	
S-V-2-5	.04	.24	
N L	1.00	2.00	
N L.	6.00	24.00	
		2773 6380	

SERVICE STORES OFFICE—STOCK AND SHIPPING COPY

LAYOUT of the Conveyor System, Showing Locations of the Several Sprocket and of the Vertical Dips to Accommodate Local Conditi articulated chain over 700 ft. long



LOCATION: N J 32

NAME: MOTOR CAMSHAFT ROCKER LEVER ASB

CARD No. 3 | NET PRICE .95 | COST PRICE | PERCENT | MODEL: 526-533-443

	No. USED PARTS ORDER	No. USED ASSEMBLY	BACK ORDER	DANGER LINE	DATE	ORDER No.	REC'D
SEP							
OCT					BAL 10		
NOV					AUG 10	88,946	312
DEC					AUG 10	82,567	312
JAN					AUG 10	95,733	312
FEB					AUG 10	82,558	312
MAR	2434				AUG 11		
APR	2753				AUG 13		
MAY	2067				AUG 13	82,707	312
JUN	3029				AUG 14		
JUL	3297				AUG 15		
AUG	421		8-15	9035	AUG 15	88,297	312
SEP					AUG 15	82,718	312
OCT					AUG 16		
NOV					AUG 17		
DEC					AUG 22	88,347	312
JAN					AUG 22	88,402	312
FEB					AUG 22	88,487	312
MAR					AUG 23		
APR					AUG 24		
MAY							
JUN							
JUL							
AUG							

STOCK DATE	SHIPPER No.	DISB.	BAL. ON HAND
			9-1

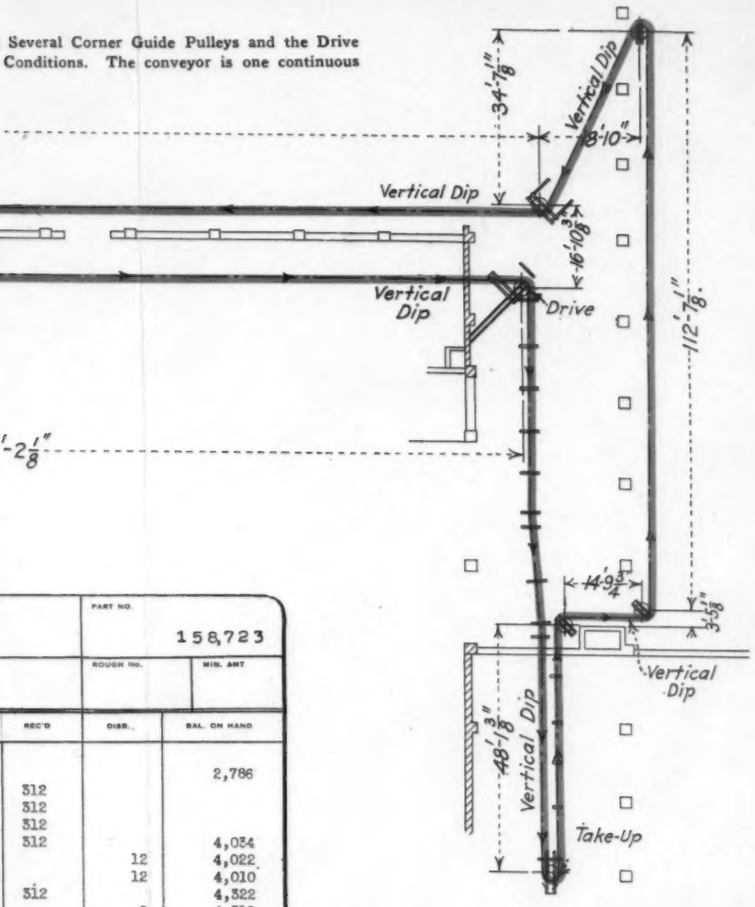
STOCK ORDERS ORDER No.	DATE	REC'D	BAL. DUE
Main			
68,701	BAL 12		5,668
82,707	AUG 13	312	5,356
82,718	AUG 15	312	
88,297	AUG 15	312	4,732
88,487		312	
88,402		312	
88,347	AUG 22	312	3,796
Main			
68,013	BAL 4		5,000

NEW PARTS | RETURN REQUEST | REMARKS:

PACKARD MOTOR CAR CO.

ONE of the 16,0 ord Cards Posted Daily Fro Shipped to Distri definitely control parts, materials hand, as all card entries have been set in the trays co to be scanned clerks, who keep supply of each established da

Several Corner Guide Pulleys and the Drive Conditions. The conveyor is one continuous



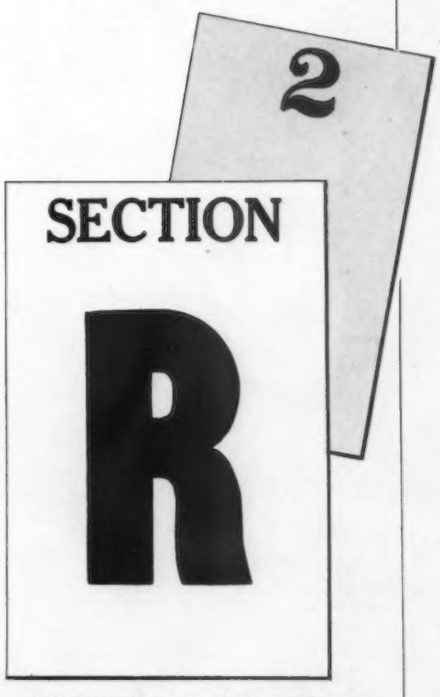
PART NO. 158,723

ROUGH No.	MIN. AMT

REC'D	DISB.	BAL. ON HAND
		2,786
312		
312		
312		
312		4,034
	12	4,022
	12	4,010
312		4,322
	6	4,316
	36	4,280
312		
312		4,904
	24	4,880
	46	4,834
312		
312		
312		5,770
	488	5,282
	67	5,215

the 16,000 Stock Rec- Cards Which Are ily From the Orders o Distributers. These control the number of terials and tools on all cards upon which ve been made are off- trays containing them, anned by the order no keep the on-hand each part above an shed danger limit

Form No. VT-4



LETTERED Section Cards Are Used on Incoming Parts to Designate the Section to Which Each Item of a Shipment Is To Be Delivered. Above lettered card is one of the numbered, vari-colored cards placed on each loaded tray moving toward the packing and shipping departments. Attached to the card by a clip is the slit section of the order

UNIV. OF MICH.

work. The five copies still intact are then passed over location and price records, where they are checked for correctness of part number and name. At this point the factory bin location is filled in and the selling price and cost per cent are entered. The order is then scheduled for the stock department, stamped with a large numeral indicating the hour in which it must be filled, time-stamped and delivered to the stockroom.

Upon receipt of the order in the stockroom the No. 3 copy, or Section Copy, is detached; the other four are placed in a folder and delivered to the checkers, where they are filed according to the schedule hour. The section copy is then passed under a printer's hand shear, where it is cut into small, horizontal strips, one item line to each strip. In other words, this copy is cut into as many different orders as there are different items on the complete order, to permit quick circulation of the orders to the various sections in which the required items are located and the simultaneous selection of all items on one complete order. These slips are delivered to the various sections, each slip going to the stock man in charge of the section in which the required item is located.

After selecting the required part or the specified number of the part ordered on the slip that reaches him, the stockroom man places the slip on one of the moving trays of the conveyor with the parts wanted from his section. His only other responsibility is to place on the same tray a colored tag indicating to which checker his contribution is destined.

POWER Plant of the Continuous Chain Conveyor Used to Assemble Parts and Sundries in the Parts and Service Division of the Packard Motor Car Co. A 5-hp., 750 r.p.m. motor and the large bevel gear shown give the conveyor a speed of 60 ft. a minute. The conveyor is raised to make room for employees passing through the aisles, giving clearance of 6 ft. 6 in.

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CHECKING and Packing Sections (Below), Where Each Part Ordered Is Lifted from the Tray, Accompanied by the Strip from the Order Blank Bearing Its Part Number, and a Colored Card or "Flag," Designating at Which Section It Is to Meet and Be Assembled With the Other Items Clipped from the Same Order. Having the four remaining copies of the order, the inspectors remove all items for each order from the trays and check them against the complete order. After the last item has arrived, the checker pushes the completed order across the bench to the packers

LONGEST Straight-Away Section of the Parts Assembling Conveyor (in Oval). This section, 207 ft. long, is devoted to very small parts such as small gears, pinions, nuts and bolts, washers, etc. Stockroom employees take off the slit sections of the order blank, select the part ordered and place both together on the conveyor a few seconds after the orders reach them. These steel bins are supplied with parts from other surplus bins, running at right angles to the aisle, on the left

RECEIVING Room (Above), Visited by the Chain Conveyor, Which Distributes to the Various Sections of the Department Shipments of Parts and Sundries Arriving by Rail and Motor Truck from Other Plants and from Other Parts of the Packard Plant. Each item placed on the tray bears a lettered card denoting the section of the department where the item is to be taken off and stored in the steel bins which line portions of the conveyor, or to the auxiliary surplus bins which run out at right angles to the conveyor at various points along its route. At this point the conveyor is closest to the floor because of the great weight of some of the items to be placed upon it here

AT This Point (Right) the Assembly Conveyor Makes a Short Excursion Into the Section of the Department Devoted to Special Tools Adapted to Packard Equipment and Supplied to Dealers, Through the Distributers, from the Factory. Here the flexibility of the conveyor is given its most severe test, as it must turn an acute angle and make a rise of 5 ft. 6 in. in a short incline to clear an aisle. Because some of the heaviest items are put on the conveyor at this point, the trays are only 14 in. from the floor

Small parts are placed in paper bags and the slip is clipped to the bag. Larger parts have the slips attached to them before they are placed on the tray.

Arrived at the checking and packing department, the parts are removed from the conveyor by the checker whose symbol card accompanies them. He checks the items against the other copies of the order that are still in his possession and assembles them with the other parts for the same order, arriving from other sections of the stockroom. Each checker handles only orders from a certain territory, with the result that orders from a given distributer are always handled by the same checker. Parts called for by several orders from the same distributer accumulate on the same section of the checkers' bench, insuring the most compact and economical packing.

As each order is completed the checker fills in on all copies of the order blank the quantity of each part that is to be shipped and makes a back-order note of any parts that may be missing for one reason or another and which are to be shipped later. The checker then passes the parts across the checkers' bench to the packers' bench. The No. 1 Shipping Copy and the No. 4 Packing Copy of the order go with the material to be shipped. The No. 2 Factory Service Office Copy and the No. 5 Acknowledgment Copy of the original order are retained temporarily by the checker, who later sends them to the Service Stores Office. The No. 2 copy is kept for stock record entries and for follow-up work on any items back-ordered. As soon as the parts are checked and ready to be packed for shipment the No. 5 Acknowledgment Copy is mailed to the distributer, to inform him which parts are being shipped and which, if any, are back-ordered, to follow in a later shipment.

When the parts are packed in the shipping case the No. 4 Packing Copy is packed inside the case with the parts and the case is then nailed up. On the outside of the case is attached the No. 1 Service Stores Office—Shipping Copy. A slat and roller gravity conveyor is used to move the packed shipping cases from the checking and packing department to the shipping department, where the shipping copy of the order is removed from the packing case and transportation papers are issued. A rubber stamp is used to indicate on each order how and when the parts were shipped. These orders are forwarded to the Service Stores Office, where the billing of the parts is done from the No. 1 Service Stores Office Copy after shipment is made. Prices on these orders are checked for accuracy in the service office, after which they are grouped with other orders from the same distributer, so that each invoice covers as many orders and items as possible.

Hollerith key punch and tabulating equipment is used to complete the invoice. A card is punched for each item shipped, showing the date, distributer's order number, distributer's code, amount shipped, part number, selling price, total selling price and cost per cent. Placed in the tabulating machine these cards make out the invoice showing all the information that has been punched upon them. A typist then enters upon the invoice the incorporated or registered name of the person or company to whom the parts are to be charged and the name of the consignee.

Stock record cards for the control of material on hand are a very important part of the Packard parts system. A definite record, posted daily, is kept of every part carried in the service department. Record cards are filed numerically by part number and show the part name, bin location, selling and cost price, models on which the part is used, record of all orders for new material, record of all parts disbursed and balance on hand. After each entry the cards are offset in the file so they can be examined by a special order clerk for check-up purposes. At the end of each month a summarized entry of the total number sold during the month is made and a danger limit is established and entered upon the card. This danger limit is the basis of control of the amount to be carried on hand and covers an average three months' supply.

To assist in keeping these records accurate a perpetual inventory system is carried out. When the entries on the records indicate that a reconciliation should be made between the amount shown to be on hand and the actual amount in the bin a special inventory form is made out and sent to the parts department, where an inventory is taken. The form is properly filled out and returned to the office, where a check is made and, when there is any substantial discrepancy, the correct amount is filled in on the card. This system detects all possible errors and keeps the records and bins in balance.

At the end of each month a special report is compiled by models under which the parts are classified. This report shows the total selling value of all parts sold, the total cost value and the profits made by each model. Additional reports are compiled showing the value of shipments by transportation classification, value of shipments per vehicle in the field, etc. A quarterly inventory is taken and analyzed by models. This is to assist in assuring complete control of inventory and turnover.

Index of National Prosperity

An unusual index has been added to the large number with which we are familiar in the shape of a British Index of National Prosperity. This has been prepared for *Economist*, London, by G. D. Rokeling and its presentation has a foreword by Sir Josiah C. Stamp.

Briefly, an index of production combined with an index of net real income from foreign investment gives an index of real national income. This number divided by an index number of population gives an index of national income per person, which for practical purposes is the measure of national prosperity. The index of production is based on the volume of raw material worked up by industry, the number of productive workers and the consumption of coal as the principal source of heat and power. The two latter items are each given double the weight of the raw material imports. The net real income from foreign investment is based upon Board of Trade estimates, influenced by Government payments and by an index number of wholesale prices.

In putting the final index together, the index of production is given a weight of 24 times that of the income from foreign investment. The figures obtained for a series of years, as indicating the measure of national prosperity, are as follows:

1920.....	101.2	1924.....	100.0(base)
1921.....	77.3	1925.....	99.5
1922.....	88.9	1926.....	91.2
1923.....	93.3	1927.....	105.3

Material Handling Systems

An exceptionally comprehensive catalog of material handling systems has been put out by the Cleveland Electric Tramrail division of the Cleveland Crane & Engineering Co., Wickliffe, Ohio. It deals with overhead means of handling products of all descriptions, whether outdoor or indoor. Illustrations are numerous, including many taken in plants of users of the equipment. A large number of details is shown as to parts of the equipment, and, in particular, its flexibility is stressed. Both mono-rails and light cranes running on two rails are shown, together with gantry cranes, jib cranes, and other overhead types of handling facilities.

Mold Gates for Diverse Castings

Those Producing Whirling Action of Metal— Riser Horn Gate and Pop Gate and Runner

BY PAUL R. RAMP*

[Following the first of three sections of this article, which appeared at page 943 of THE IRON AGE for Oct. 18, and in which the author showed correct methods of preparing gates for molds for face plates, die blocks, cast-teeth gears, driving box shoes and globe valves, Mr. Ramp in this installment takes up several other specific cases and tells why certain methods of treatment will give the best results.—*Editor.*]

Designing a Skim Gate

DETAILS of a standard skim gate, with four examples of how the skim gate can be used to obtain the benefits desired, are shown in the first illustration. Metal enters the pouring gate and is choked at the inlet gate *B*, and the impurities rise to the top of the skimmer *E*. But to have a standard in making these skim gates the various dimensions may be summarized.

When the pouring gate is 1 in. in diameter at *H*, the skimmer should be 2 in. in diameter at *I*. The distance *J* between the outside of the pouring gate and the outside of the skimmer should be no less than 2¾ in., if it is at all possible to have this much room in the flask. If the flask is not large enough for a skim gate of these dimensions, it is better to use a larger flask.

The passage leading from the pouring gate to the skimmer should always be as wide as the diameter of the pouring gate, and about 1¾ in. deep. This point is shown at *K*. Where this passage enters the skimmer at *L*, it should be as wide as the outside diameter of the skimmer and about 2⅛ in. deep. These dimensions can be varied to suit conditions. The standard skim gate described here is what can be considered ideal. But the relation of the diameter of the pouring gate to that of the skimmer could not be worked out on a regular scale, at least any further than a 2-in. pouring gate and a 4-in. skimmer. There are few cases where a skimmer gate of this character would be used as large as this.

*Superintendent of foundry and pattern shop, Newport News Shipbuilding & Dry Dock Co., Newport News, Va.

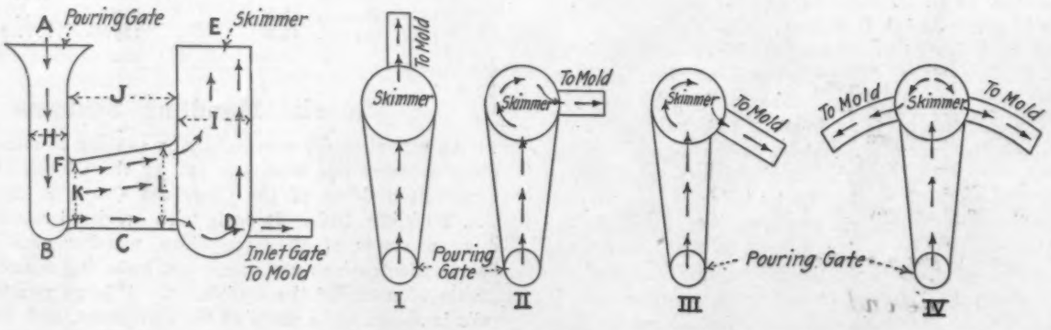
Sketches I, II, III and IV are layouts showing different arrangements for the skim gate. Sketch I is of what might be termed a straight-away skim gate. The metal enters the pouring gate and travels in a straight line to the skimmer, and from the skimmer through the inlet gate to the mold. If the gate is filled quickly enough to choke at *A* this is a very effective gate. But Sketch II shows a more effective plan for skimming. The metal leaving the pouring gate flows into the skimmer and is forced to make a half circle before it can enter the inlet gate to the mold.

This creates a whirling action of the metal and forces all the impurities or lighter substances to the center of the skimmer, which allows them to rise freely to the top of the skimmer. Sketch III shows a more effective plan than Sketch II because the location of the inlet gate leading to the mold is located in such a manner as to create a still greater whirling effect. Sketch IV presents a method used to meet a different problem, where two castings are fed from the same pouring gate and skimmer. The arrows indicate the manner in which the metal enters and leaves the skimmer on its passage to the molds. This plan gives better results than would be obtained if a casting were poured with a gate similar to that in Sketch II.

The whole plan is to design a gate that will effectively choke the metal where it enters the inlet gates that lead to the mold, and at the same time provide a free escape for all impurities collected at this point.

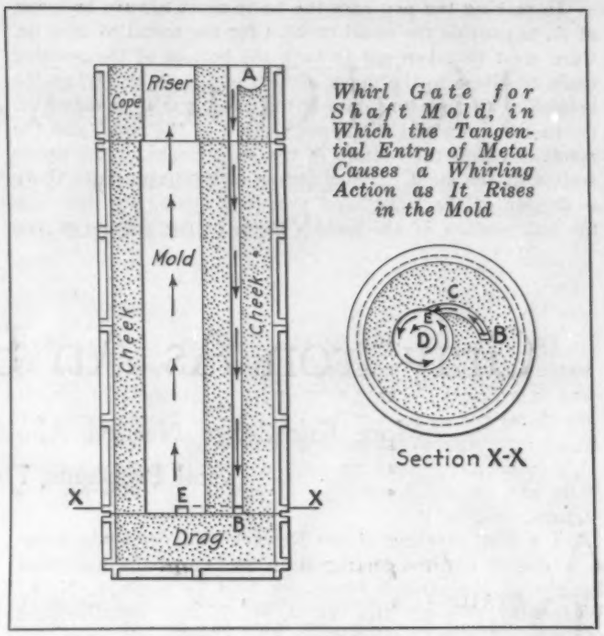
Whirl Gate for Shaft Mold

ANOTHER view gives two cross-sections of a mold for a cast iron shaft or plunger or roller. This casting must be free from defects and should be cast on end in dry sand. The most effective gate to use on a mold of this character, to produce a clean casting, is a whirl gate as shown. Metal poured into the pouring basin *A* flows through the down gate and enters the whirl gate at *B*. It travels through the whirl gate and enters the mold at *E*. The circular view is a horizontal cross-section of the mold, showing the form of the whirl gate at *C*.



Skim Gate Arrangements, with Vertical Section (at Left) and Four Plans. Why one plan is better than another is explained in the text

The arrows indicate the manner in which the metal enters this mold on a tangent, compelling the metal to travel in a circular path until the mold is filled. This whirling motion forces all the impurities to the center of the column of metal and prevents any of it from clinging to the sides of the mold. The result is that all dirt and other impurities go up into the riser, above the upper limit of the mold proper. When the riser containing the dirt is removed, a perfect, clean casting remains.



Whirl Gate for Shaft Mold, in Which the Tangential Entry of Metal Causes a Whirling Action as It Rises in the Mold

Riser Horn Gates

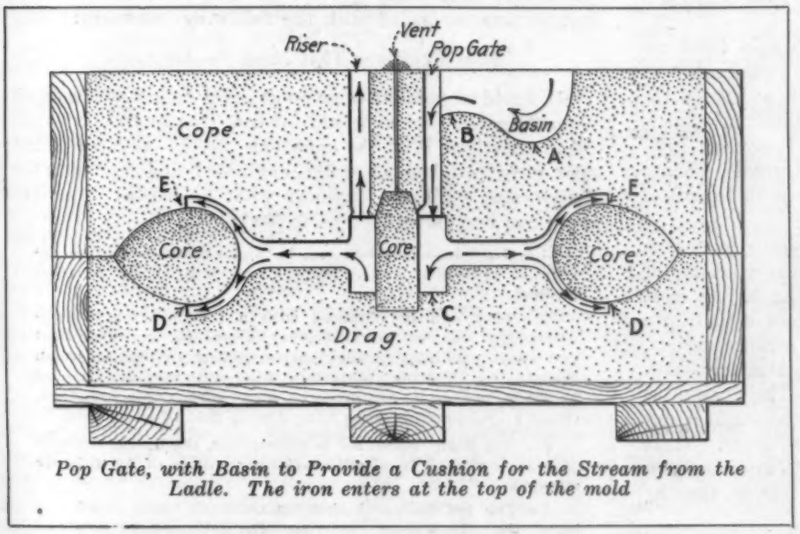
OCCASIONALLY there are cases where a horn gate cannot be used in the drag part of the mold, and neither can the mold be gated on the outer edge, on account of a thin knife edge at this point; owing to the fact that a large riser or feeding head is desired in the solid hub, it cannot be gated in the hub. This condition presents another problem in gating, and the correct method in cases of this kind is the use of what we term a riser horn gate.

A riser horn gate is a horn gate that leads the metal directly into the riser, as shown in the cross-section of a disk mold with a heavy, solid hub. It would be impossible to gate this mold on the outer edge, which is indicated by *E*. Both sides of this disk blade, shown at *DDDD*, must be perfectly clean, which is another reason why the metal should not enter the mold at any such point as this.

For economical reasons it is not desirable to use the horn gate in the drag, as shown in our other sketch of a horn gate. (Page 945, Oct. 18 issue.)

To insure a solid hub, a riser or feeding head almost as large as the hub itself is used. This prohibits the use of a pop gate on the hub, and the riser horn gate is used as shown. In this case the metal is poured into the pouring basin and is choked at *A*, where it enters the horn gate; it then flows through the horn gate into the riser at *B*.

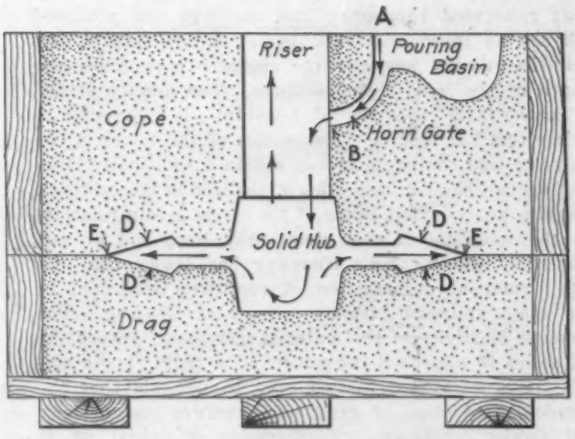
In daily practice, where a large variety of work is made, this combination of riser and horn gate is often very desirable. It is hardly necessary to state that it would be disastrous to attempt to pour a mold of this kind directly through the top of the riser, and expect to get a good casting.



Pop Gate, with Basin to Provide a Cushion for the Stream from the Ladle. The iron enters at the top of the mold

Pop Gate and Runner

IN making molds for sheaves and other castings which cannot be poured at the outer edge, and which cover an area so great as to make it impossible to use a horn gate, the pop gate and runner is the proper gating method used. This is illustrated in the cross-section of a sheave mold. The metal is poured into basin *A*. The basin must be filled very quickly in the beginning, so as to choke the metal at *B*, where it leaves the basin and flows through a pop gate down through the bottom of the hub at *C*. As soon as the hub is filled the metal flows toward the outer edge of the mold, indicated by *D*, continues to fill the mold up to *E*, and finally ascends to the top of the mold and up the riser. This plan distributes the metal evenly all over the mold and eliminates the possibility of the casting being thicker at one point than another. That happens often when a mold is gated on the outer edge, as more pressure is exerted there, which tends to strain the mold and make it swell adjacent to the gate.



Riser Horn Gate, in Which Metal from the Pouring Basin Reaches the Mold through One Side of the Riser

In making the pop gate the basin must always be lower at *A*, to provide the usual cushion for the metal to drop on. Care must be taken not to have the bottom of the pouring basin too close to the upper section of the mold. When the bottom of the pouring gate is too close, gas is confined between the basin and the upper section of the mold, and the result is either the bottom of the basin scabs or the upper section of the mold. If the bottom of the basin scabs there is danger of the loose sand produced finding its way into the hub portion of the mold. If the upper section of the mold has scabs the casting will be found full of sand holes.

Pop gates as described here can be used effectively on pulleys, gear wheels and similar castings. But more care must be exercised in making a gate of this character than with any other kind. And more care must be used in pouring through a gate of this character, as the only place it is possible to choke the gate and hold back the slag is at the point where the basin enters the pop gate.

(*To be concluded*)

Gray Iron As An Engineering Material

More Knowledge Needed About Actual Strength in Castings— Vital Problems That Must Be Solved

AT a joint meeting of the Newark Foundrymen's Association and the Metropolitan Section of the American Society of Mechanical Engineers held in Newark, N. J., Wednesday evening, Oct. 24, J. W. Bolton, metallurgical engineer of the Lunkenheimer Co., Cincinnati, was the principal speaker. His topic was "Gray Iron: An Engineering Material."

The first part of Mr. Bolton's address was a brief review of the structure of gray iron, and its relationship to various physical properties. The speaker then devoted the rest of his time to a discussion of the engineering properties. Among the points stressed were the following: Reliability of gray iron castings has improved greatly during the last few years. This is particularly true in foundries utilizing technical control.

The most important theoretical development in gray iron metallurgy is the increased knowledge of the relationship of graphitic carbon to the mechanical properties of the iron. It was pointed out that highest strength irons usually are low in total carbon, with pearlitic or even sorbitic matrix, with small general grain size and, most particularly, with very fine distribution of graphitic carbon. The answer to the problems of cast iron as an engineering material is not universal adoption of higher strength cast irons. It is furnishing the engineer with more complete and accurate information of the various *grades* of cast iron so that he can make intelligent selection therefrom.

Knowledge of Strength in Castings Essential

Speaking of the necessity for soundness and uniformity it was reiterated that gray iron castings are produced which are as thoroughly reliable as can be cast in any metal. For design purposes the engineer must know the strength of the iron in the castings. The quality of the iron "in the ladle" is of no value to him. It is possible to correlate test bar results to properties of the metal in the castings so that the engineer can obtain a sufficiently close idea of the mechanical properties of the iron in the castings.

Careful analysis was made of the stress strain relationships characteristic of cast steel, gray iron, and bronze. Research by the speaker's company has shown that the initial permanent deformation of cast iron subjected to stress may approach zero on repeated loading. The modulus of elasticity of the material increases. Indeed the metal seems to approach the nature of a truly elastic material. It is suggested that it may be possible that the mechanical properties of gray iron improve under many actual service conditions. Furthermore, if initial set is permissible, the useful stress resistance of the iron may be a high proportion of the initial breaking load.

In a discussion of various other engineering properties the speaker pointed out the excellent wear resistance of gray irons and deprecated condemnation of all grades of iron for use at elevated temperatures on account of failures occasioned by the selection of improper grades. Many irons retain their strength up to 800 deg. Fahr. and remain practically free from growth at this temperature. The lecture was concluded with the following summary:

Real Questions That Must Be Answered

It would be possible to go on at great length and in detail recounting the various grades of cast iron and their physical properties. But the questions before us are: What does gray cast iron offer the engineer? and how will the foundryman offer the engineer what he needs? Possibly these can be summarized as follows:

1.—Gray iron castings can be and are made with a degree of uniformity and soundness not exceeded by any cast product.

2.—They can be obtained with a tensile strength anywhere from 20,000 lb. to 60,000 lb. per sq. in. Excellent and easy machining grades corresponding to the American Society for Testing Materials high-test specifications of 33,000 lb. per sq. in. are made by many responsible foundries. Other lower strength irons have a wide field of usefulness.

3.—If a slight initial set is permissible, the useful strength of gray iron may be a quite large percentage of its ultimate strength.

4.—The low-carbon high-strength irons resist shock far better than the weaker varieties. The fatigue limit stress of gray irons may be 33 per cent of their ultimate strength.

5.—Gray irons have high hardness compared to their machinability. Their wearing properties are exceptional and deserve more attention from designers.

6.—Better grade irons maintain their strength and hardness well at elevated temperatures. Such irons are not subject to growth at lower temperatures—say under 800 deg. Fahr. for some conditions. The 450 deg. Fahr. restriction seems unfortunate when applied to better grades of iron.

7.—Gray iron resists some types of corrosion very well—for example, concentrated sulphuric acid and various caustic liquors. One comparison with steel is afforded by looking under some of the piers at Atlantic City.

8.—Easy machinability of gray iron has led to some abuses. Close grained tough iron naturally cuts a little harder than inferior grades. Considering its strength and hardness, gray iron machines very readily as compared to some other cast materials. One cannot have his cake and eat it too.

9.—The foundryman should know more about his own product to enable him to market it more intelligently. There are many grades of cast iron, and too little information available on any of them.

10.—The engineer needs more accurate and detailed information. It is up to the founder, through his technical and trade associations, to furnish the proper data. To do this costs money, and a penny-wise pound-foolish attitude is not going to advance the industry.

Points Way to Continued Prosperity

President Schwab Urges Institute Members to Cultivate New Uses for Steel and to Cease Price Cutting and Plant Expansion

COMMENTING on excellent current business conditions, which apparently are unaffected by the coming national election, President Charles M. Schwab of the American Iron and Steel Institute forecast a period of prosperity transcending anything yet experienced. In addressing the thirty-fourth general meeting of the institute at Hotel Commodore, New York, Oct. 26, Mr. Schwab not only emphasized the promising outlook, but urged the need for a policy that will at once give the iron and steel industry its deserved share of prosperity and a more definite assurance of continued good times. There are apparently three ways, he said, in which the industry can be stabilized on a prosperous basis. These are:

1. By stimulating the demand for steel.
2. By discouraging increases in producing capacity.
3. By avoiding uneconomic price cutting.

"For 10 years," Mr. Schwab stated, "we have been struggling to overcome conditions occasioned by the war period. These conditions are largely behind us and we are entering a constructive era of business engineering. . . . Our problems are not essentially different from the problems of other basic industries. They are not insoluble, but they must be solved in the future, as they have been in the past, without unlawful agreement, or collusion. They can and will be solved when we, the leaders of our industry, appraise better fundamental principles of economics, and apply them in our various lines of activities."

Mr. Schwab's address reflected a broad grasp of current business problems in their far-reaching ramifications. He saw in the new attitude of the public and the Government toward so-called "big business" one of the best promises of continuing prosperity. He recognized the stake American business has in maintaining the buying power of American workers. He commended efforts to improve the economic status of the farmer as of prime importance in achieving a better distribution of prosperity, to the benefit of all classes and all industries.

Must Develop New Uses for Steel

"Much has been done," said Mr. Schwab, "to increase the demand for steel by finding new fields in which it may advantageously be used, but much more can and should be done. An extension of the activities of research departments not only to make improvements in the quality of our products and in the methods of producing them, but also to discover new uses for them, is desirable. A closer cooperation between the producers of steel and our customers, promoting a better understanding of our customers' problems and resulting in our providing steel which will more perfectly meet their requirements will often prevent the customer from seeking substitutes for steel. In these and many other ways the demand for steel can be increased and thus help to restore permanently a proper balance between demand and supply."

Better merchandising, particularly in pricing, was also urged by the speaker.

"If you buy any article of merchandise in a department store," asserted Mr. Schwab, "you know that you are paying substantially the same price that any other purchaser on the same day will pay, and that it is useless for you to discuss the price with the clerk for it will not be changed. The department stores long ago learned the economic necessity of maintaining a single price open to all. The steel industry has never learned this, or, if it has learned it, has forgotten it, and instead of charging a single price open to all, we in the steel industry have been charging many prices, often quoting different customers different prices for the same products on the same day. Such a policy has resulted, and will inevitably result, in harming certain of our customers through price discrimination and

Have Foundation for Unprecedented Prosperity—Charles M. Schwab

OUR country as a whole is still in the high tide of prosperity, and prospects for the immediate future are unusually favorable. The unemployment which existed in some measure a few months ago has lessened. Workers generally are now fully employed and at good wages. The relations between labor and management were never more harmonious, due to the wise attitude of cooperation and conciliation existing on both sides.

Business sentiment is good. This is particularly reassuring in view of the fact that we are to elect a new President of the United States within two weeks. It indicates that there exists little apprehension as to the results of the election and their probable effect on business.

Although we have had several remarkably good business years in this country, fundamental conditions remain sound and I say with confidence that there has been established a foundation upon which there may be built a structure of prosperity far transcending anything we have yet enjoyed.

in hurting ourselves by inviting our customers to haggle over prices, and tempting them even to misrepresent the prices charged by our competitors in the hope of coaxing lower prices from us.

Unjustified Discrimination Should Give Way to Open-Price Policy

"Now discrimination, as between customers, in prices which reflect merely differences in tonnages or differences in the character of service demanded by our customers are entirely proper. But there are other forms of discrimination in price based upon considerations less defensible. It is obvious that, inasmuch as steel is so heavy a product and the freight rate on a long haul bears so important an influence upon the final cost, it is advantageous to consumers and economical to the industry that in the great majority of cases the product should be supplied at a fair price from the nearest available plant. For a manufacturer a considerable distance away to underbid the fair price offered by the nearby plant is obviously uneconomical and tends to indiscriminate price cutting and to cross-hauling, an unwise practice of our industry to which I referred at some length in my talk last May.

"No one will deny that the maintenance by each producer of any basic commodity of substantially uniform prices, at a proper level, is a desirable thing not only for the producers but also for the consumers. Fluctuating prices compel the consumers to speculate on the cost of their raw materials. Such stabilization of prices is entirely possible of attainment without agreement or collusion on the part of the producers. It requires merely a general recognition by the producers of two simple facts, viz.: 1. The steel business is unlike many other industries in that, within certain limits, the demand for steel products is not appreciably affected by the general price level, and, therefore, a general reduction in prices for steel products alone does not result materially in increasing demand; and, 2. It is not possible in a basic industry like ours to make effective for long at any one point two different prices for the same commodity.

"When one producer lowers his price for a particular commodity, that price will promptly be met by his competitors. The net result in the long run is that each producer continues to produce substantially the same percentage of the total tonnage as before, but with a smaller profit margin, and sometimes none at all. I believe that a general recognition of these two facts would go far to remove the first economic cause of our failure to share in the general prosperity of this country, and that the adoption of the policy of open prices, open to all without preference or discrimination, would be of benefit alike to our industry and to our customers."

Favors Moratorium in Plant Building

Construction of additional steel-producing capacity should be discouraged by every lawful means, according to President Schwab.

"The law of supply and demand is inexorable, and if the producers of steel in this country do not voluntarily refrain from expanding capacity beyond the needs of the country, they can expect only one consequence. The law of supply and demand will promptly operate, reducing profits to the extent necessary effectively to discourage new construction, and that conditions will continue until demand has again increased sufficiently to take up the excess capacity. I wish it were possible to have a temporary moratorium on the construction of steel capacity in this country. I firmly believe that, with such cessation of new building, the relationship between demand and supply can thus be established on a basis which will insure fair and reasonable profits in the industry for many years to come, for, while our industry will, I trust, never cease growing, in my judgment the technological developments resulting in improved processes and enlarged units alone will render unnecessary for a considerable period the building of new plants to meet increased demand."

Mr. Schwab stated that steel-making capacity in the past 12 years had been sharply increased not only by new construction to meet the demands of the war, but by improvements in methods and practices since the war.

"Coincident with this increase in our capacity there has been a smoothing in the curve of demand that has largely eliminated the peaks and depressions in the demand for steel with which the industry was familiar before the war. Whereas formerly demand exceeded capacity during certain periods, it does so no longer, and in more than five years there has not been a time of any substantial length when the capacity of the industry was unable to supply promptly the peak demand. The result has been that at no time in the last five years, until very recently, has the law of supply and demand operated to improve prices in our industry.

Steel Consumption Growing at a Slower Rate

"Along with the large increase in the steel capacity of this country, there has been, and always will be, a steady increase in the demand. But in one respect there has occurred an important change—in the past the rate of increase in demand was very rapid, and demand doubled about every 10 years, an average increase during each decade of 10 per cent per year. No longer does it increase at the old rate. It has not doubled during the last 20 years, and in the 15 years since 1913 it has increased only about 55 per cent, an average increase of less than 4 per cent per year. Consequently, although formerly the normal increase in demand afforded a prompt corrective of an over-expanded capacity, it no longer operates so promptly.

"In other words, we can no longer blindly increase our capacity relying upon the normal increase in demand to correct quickly our errors in over-building. Here is a fundamental change in our industry the significance of which has apparently not been generally realized and the present seems to me a peculiarly appropriate time to urge it upon your attention.

"Following an unusually active summer the steel industry is now operating at about 90 per cent of its capacity, and as we enter the fourth quarter there is every indication of a sustained demand that will insure a high rate of operations for the balance of the year.

"It is now a certainty that the year 1928 will establish a new record in volume of production for the steel industry of the country. Insofar as an increase in demand is the solution of our economic difficulties we are nearer to a proper relationship between supply and demand than we have been since the end of the war. This increase in demand has resulted, as should be expected, in a betterment in prices—virtually the first improvement that has occurred in five years. I hope and believe that there will be a still greater improvement in prices, sufficient to afford to the industry a return upon its investment fairly comparable with that realized by other leading industries.

"But, once a fair price basis is established, how long will it continue? As long, I say, as the proper relationship between supply and demand is maintained."

Mills Should Be Paid for Quality and Service

The price per ton that mills charge their customers is not the main consideration in relations between sellers and buyers, according to George M. Verity, president American Rolling Mill Co., Middletown, Ohio, who also addressed the institute. There is a factor of quality, service and understanding of the customer's product which is far more important. From the customer's point of view an increase in price of $3 to $5 a ton is insignificant; he is not interested primarily in the cost of his raw materials, but rather in his total manufacturing costs. The mills, said Mr. Verity, are

entitled to a price for the product itself, and for the quality and service they give the customer. He considered it important that steel manufacturers establish a close liaison with the users of their products.

Speaking of the difficulties that have arisen from surplus steel-producing capacity, Mr. Verity said:

"We must come to the time when the problems of production may be controlled in some legal way that will not be opposed to public interest. It can be done. It must be done."

Commenting on the fact that the steel industry has not been receiving a fair return on its investment, H. S. Wilkinson, chairman of the board Crucible Steel Co. of America, New York, said that he believed a point had been reached when benefits were accruing from the cooperative spirit manifested in discussing business difficulties.

"I believe there is more confidence among members of the steel industry today than there has been since the war," he said. "I believe there is a feeling of confidence in each other that has not existed since 1920. I believe that we are going to have an increased return and that we are entering the greatest era of prosperity since 1920."

While the steel industry will undoubtedly produce a record tonnage this year, with profits above the average, Willis L. King, vice-president Jones & Laughlin Steel Corporation, Pittsburgh, said that a serious problem is still unsolved—the proper merchandising and distribution of its products.

Myron C. Taylor Is Banquet Speaker

The banquet, held in the evening in the Grand Ball Room of Hotel Commodore, broke all records for attendance, with a total of over 1750. The principal speaker was Myron C. Taylor, chairman of the finance committee of the United States Steel Corporation. He paid tribute to the leaders of the steel industry, past and present. He saw an interesting parallel in the lives of Charles M. Schwab and James A. Farrell, both of whom rose from the ranks to leadership in their respective companies and both of whom retained the affectionate regard of their employees. His reference to Mr. Farrell as the "big man of the Steel Corporation today," was the signal for an ovation that the latter was compelled to acknowledge.

Work, according to Mr. Taylor, is the great secret of prosperity. He saw much to be thankful for in the fact that George F. Baker, Jr., and the younger J. P. Morgan, both sons of extremely wealthy fathers, are devoting their lives to work.

Dr. Eckener a Banquet Guest

Dr. Hugo Eckener, commander of the Graf Zeppelin, briefly acknowledged the cheers that greeted him when he was introduced, and, in discussing the progress in modern air transport, said that dirigibles must, and can be expected to, increase in speed, safety and practicability.

Other distinguished foreigners who spoke were Aloyse Meyer, chairman of the International Steel Cartel and president of the Acieries Reunies de Burbach-Eich-Dudelange, Luxemburg, and Ernst Poensgen, Stahlwerks Verband and United Steel Works Corporation, Düsseldorf, Germany. M. Meyer said that what impressed him most in the American steel industry was the spirit of cooperation and collaboration that existed between management and workers. He called attention to the fact that, in visiting the country making the largest total tonnage of steel, he came from a country with the largest production per capita, 10 tons per year.

Other features of the banquet program were an address by Dr. Harry Emerson Fosdick, pastor of the Park Avenue Baptist Church, New York, and brief remarks by Dr. Elmer A. Sperry, of the Sperry Gyroscope Co.

Gary Medal to Be Awarded in Spring

At the meeting of the board of directors of the institute it was decided to award the Elbert H. Gary medal, for the most notable service to the iron and steel industry, in the spring, and the American Iron and Steel Institute medal, for the best paper of the year, in the fall. E. T. McCleary, president Republic Iron & Steel Co., was elected a director of the class of 1929. The membership of the institute was increased from 1600 to 2000; the number of associate members was raised from 600 to 800.

Abstracts of the technical papers follow:

Acoustic Laboratory for Testing Music and Other Steel Wires

BY WILLIAM BRAID WHITE

THE American Steel & Wire Co. during many years has specialized in the manufacture of wires for the music industries, meaning by that steel wires for pianos, for mandolins, guitars and banjos, for the E strings of violins, and so on. The aggregate amount of the wire thus made may be called great or little, depending upon whether the output is measured by the ton or by the mile. A ton of piano wire of mean diameter will run to about 70 miles of length.

Piano wire output from the viewpoint of tonnage is, therefore, small, yet when we take into consideration all

BORN in Great Britain in 1878, William Braid White was graduated from Cambridge University. He became interested in musical acoustics more than 25 years ago while acquiring a practical knowledge of musical instrument manufacturing in New York, where he settled 28 years ago. In 1904 he became, and has remained, technical editor of the "Music Trade Review," New York. In 1921 he opened a laboratory in Chicago for the more practical study and investigation of acoustic problems with special reference to piano construction. In 1927 he became acoustic engineer of the Amerian Steel & Wire Co., which position he still holds. He is a member of the American Society of Mechanical Engineers, the American Physical Society, the American Iron and Steel Institute, the American Association for the Advancement of Science, and the American Astronomical Society. He is the author of a number of books and technical papers dealing with subjects in his field.

the piano wire, all the spring wire which is in effect piano wire not up to piano requirements, and add to this all the wire used for musical strings in the smaller musical instruments, we have quite a respectable output. Furthermore, this is not the sort of product which can be turned out by the thousand tons in the certainty of the first and the last inch-length being exactly the same. The making of music wire is something which brings the steel mill and the wire drawer into a contact, far closer than most people would suppose possible, with the science of acoustics and the art of music.

So much has been realized for a long time, and means had been sought whereby closer liaison between makers and users of steel music wires might be perfected, but it was only during very recent years that such a contact became really practicable upon a sufficiently large scale. About two years ago it became certain that the manufacture of music wire would be greatly benefited by the establishment of means whereby the requirements of musical instrument manufacturers might be more nearly determined, and to some extent anticipated.

Measuring Tensions in Steel Wire Piano Strings in the Acoustic Laboratory

We have been much interested in the fight which the American music industries have been making. Realizing that music in America is becoming steadily more important, and that the annual expenditures on music are increasing even faster than the increase of population, we have faith in the future of American music industries. Consequently, when it became evident that these music industries would encounter unexpectedly strong competition, we saw an opportunity to accomplish simultaneously two much needed and rather important pieces of work:

> First, to accumulate a mass of much needed facts about the actual behavior of steel wires in musical instruments, to the end of thereby acquiring knowledge which could be put to use to good advantage in our drawing mills.
>
> Second, to furnish through the same methods to the music industries technical assistance to help them to improve their methods of construction, bring their designs and production up to date, build better instruments without increasing costs already high, and in general adjust themselves to new conditions.

It was felt that the only way of increasing the output of music wires was to do whatever could be done to assist the sale of musical instruments, and that this in turn meant, so far as we were concerned, rendering scientific help in the way of research into fundamentals and the development of new ideas that might be of use to the music industries.

[The author then describes the apparatus and methods used in carrying out this research.]

It may now justly be asked: to what is all this leading? In the first place, it is a characteristic of industry today that it anticipates rather than follows. When a great industry that is an outlet for certain special products of a manufacturer of basic material is in a position where it needs technical assistance, but at the same time is not organized to provide this from within its own resources, it is wise to proffer that assistance if it is possible.

Then, again, when a manufacturer of basic materials discovers that he can learn hitherto unknown but very valuable facts about his own product, considered from the point of view of the user primarily, and only secondarily from that of the maker, he is merely being wise in putting the discovery to account and making the most of it. That is what we have been doing in the field of this extremely specialized and highly organized product, piano wire.

We believe that we have in this laboratory started something new and valuable. The great constituent factors of the steel industry are not in the public mind usually associated with anything so ethereal as sound waves. Yet, if what I have told you has meant anything at all, then surely there is no field more favorable for the operation of the policy of constructive anticipatory research than is furnished by the music industries, the greatest and most important part of which depends absolutely upon steel wire for the very heart of its products. One might indeed speak of "the steel heart of music" and the title would be both appropriate and significant.

There is a last point to be considered, which indeed contains the conclusion I wish to draw. The accomplishments of research departments in the automotive, the electrical and the chemical industries have habituated the public mind to the thought of applying scientific methods to large-scale business. Research really means nothing more than fact-finding; and scientific wonders, so-called, are merely the result of applying accuracy and patience, backed up by suitable apparatus, to the task of finding facts. Today we live in an age of substitutes and adulterants as well as of new discoveries and new applications of old ones.

No industry, however well founded it may think itself to be, can afford to neglect the possibility of some future, perhaps already imminent, form of competition arising from new discoveries in synthetic chemistry or in applied physics. Did the wire industry foresee that hairpin wire, for instance, would suddenly cease to be an important product? I could multiply examples, but my meaning will be understood. I say that today every great industry must face the fact that the application of scientific method is turning things upside down all over the world, and that no amount of good will, no magnitude of operations, no apparent essentiality of product, can render any industry safe that does not take into account the possibility of substitutes arising to steal away its most profitable markets overnight.

The research that you have seen and heard described may seem but a small thing; but it gives an idea of the field that is open to development. It is plain that industrial policy during the next few years must run in the direction of determining scientifically better methods of manufacture, reducing costs and improving product, while continually maintaining a contact through technical service and anticipatory research with the minds of customers, ascertaining

not only their wants of today, but their probable wants of tomorrow.

Opinions of Piano Makers and Users

FOLLOWING a very interesting and somewhat extemporaneous presentation of the paper by Mr. White, accompanied by an exhibition of some of the apparatus used in his laboratory, Ernest Schelling, an eminent pianist and composer, played two compositions upon a grand piano, the strings of which had been scientifically investigated by the methods illustrated by Mr. White. Preceding the playing, Mr. Schelling voiced his thanks that this is not entirely a wireless age and stated that in playing the Polonaise by Chopin, it was estimated that the energy expended by the pianist was equal to that necessary to lift two tons one foot. Mr. Schelling then performed in his masterful manner this classic composition by Chopin and later played as an encore the "Bells at Ragusa," a place located along the shores of Dalmatia. This was presented by Mr. Schelling as an illustration of over-tones and it is understood that it was his own composition.

Commenting on Mr. White's paper, Paul H. Bilhuber, assistant manager of the factory of Steinway & Sons, New York, said that piano makers are demanding a better wire and that the cooperation between them and Mr. White's laboratory was resulting in mutual benefit. The problem before the industry was the securing of a rust-resistant wire, and he said that he felt if an alloy steel wire could be successfully produced which would be suited both for tonal effect, as well as strength, it would be superior to the present article. Wires plated with cadmium, tin and zinc had been tried, but were unsatisfactory, due to a tendency to chip and other defects. Mr. Bilhuber said that plating wire with chromium was a possibility on which more work is necessary to ascertain whether the tendency to inferior tonal results could be overcome.

Uniformity, Continuity and Magnetic Testing

BY A. V. DE FOREST

A MOVING picture constituted the principal part of the paper by A. V. de Forest. It was accompanied by explanatory remarks as the various features of certain phases of the magnetic testing of steel were unfolded on the screen. In substance Mr. de Forest said:

The term uniformity is used to mean the similarity in composition, grain structure, strength, hardness, etc., that is obtained in different pieces of steel or different portions of the same piece. Continuity on the other hand is a question of the physical integrity of the material—the absence of seams, transverse fissures, unwelded blow-holes and mechanical imperfections in general.

The usual methods of test, chemical, microscopic and mechanical, assume uniformity between test specimen and product. This assumption can be verified and large quantities of material tested by non-destructive magnetic methods. In general, different methods must be used to distinguish discontinuity from non-uniformity. The nature of the product will determine the most advantageous form of test. In some cases both are necessary.

The moving picture shows the various ways of making magnetic tests, and the kind of information that may be gathered with the different methods. The oscillograph record of the varying magnetic properties of a spring is shown as usually plotted against a continuous timing line, and also in the form of a cyclogram or closed loop using a harmonic timing line. The mechanism of the alternating current galvanometer with separately excited field was described and the valuable features of this form of test were indicated.

Locating Fissures in Steel Rails

SOME of the recent results which have been obtained by a new method of locating defects in rails were described by Dr. Elmer Sperry of Brooklyn, after the presentation of Mr. deForest's paper. Doctor Sperry recounted some of the early history of efforts to locate fissures in rails by magnetic analysis and mentioned the work of the Bureau of Standards and some American inventors. He said that in order to show up the true inwardness of a bar of steel, it is really necessary to submit it to electrical energization, and he said that it was on this principle that his new apparatus had been constructed after consultation with various scientists in this country. It had been found by the use of this apparatus that fissures in rails can be accurately located within 1/32 in. of the actual place where they exist. It is accomplished by passing 2000 amp. of current through the rail which, if the rail has no defects, will record a straight line on the recording apparatus, but if there are

FOR a number of years A. V. deForest has been studying the magnetic properties of steel and, more especially, the correlation of these properties with metallography and physical properties. He is recognized as one of the leaders in research work in this field in the United States. He was graduated from the Massachusetts Institute of Technology in naval architecture in 1912 *and was with the New London Ship & Engine Co. for a year, after which he became an instructor in civil engineering at Princeton University. Later he studied metallography at Princeton and Columbia Universities. He then spent two years in the research department of the Remington Arms Union Metallic Cartridge Co. In* 1918 *he assumed his present position as research engineer with the American Chain Co., Bridgeport, Conn.*

any defects, the current is obliged to pass around them and thus immediately the location is recorded. By special equipment the rail is marked with white lead at the point where the defect is revealed. Doctor Sperry illustrated some parts of his apparatus by slides and said he felt that the problem of detecting unsound rails had been solved. A detailed description of his new apparatus will appear in a later issue of THE IRON AGE.

Present Status of Structural Steel Welding

BY F. T. LLEWELLYN

SEVERAL questions were asked two and a half years ago by I. H. Edwards, chief engineer American Bridge Co., that have formed the basis of an extended research, under the latter's chairmanship, by the American Bureau of Welding. This investigation (which is yet uncompleted) covers 57 forms of simple joints in 191 sizes, welded by gas or arc. In order to determine the degree of uniformity of commercial practice that may be expected, multiple specimens are being made by 36 representative fabricators, governed by uniform procedure and inspection regulations. In the light of such results as are now available, and of the common experience of the welding industry, the answers to the questions are as follows:

1. *Can standard grades of steel be satisfactorily welded?*

The unqualified answer is "Yes" for structural steel conforming to Specifications A-7 or A-9 of the American Society for Testing Materials. The weldability of these goods is established by thousands of tests, and by satisfactory service of welded joints in important commercial structures in every section of the country. Proper welding wire must be used. (The discussion is confined to direct-current metal-arc welding.) The wire used engraves its indelible signature on the weld. American Welding Society Specifications E1A (maximum carbon, 0.06 per cent) or E1B (carbon, 0.13 to 0.18 per cent) will prove adequate.

2. *What effect will the welding operation have on the base metals that are to be united?*

The answer is that it will have no harmful effect—certainly not if the base metal is mild steel. This feature can be presented more clearly with the aid of a diagram drawn to an enlarged scale. Referring to the weld as a whole, it has been well said that welding wire normally deposits a soft steel that is purer than its source. This refers to the typical zone in the body of the weld. The transition zone never attains a thickness of 0.04 in., and only about 0.01 in. consists of the portion where there is interpenetration of base and weld metal. It is sometimes invaded by impurities from the base metal, but no impurity in the weld metal ever penetrates beyond the transition zone into the base metal. Therefore any effect of the welding operation on the base metal beyond must be merely a thermal one.

Micrographs show that the transition from base to weld metal is marked by a reduction in grain size, that is to say, by a refining effect, but it is also sometimes accompanied by more slag inclusions than occur in other portions of the weld. In welds properly made, with good wire, these inclusions are too minute to be visible to the naked eye and should not be considered as serious defects. They do mean, however, that the metal in this zone is 70 to 85 per cent as strong as that in the body of the weld.

This weaker zone is compensated for by providing contact surfaces that are greater than the throat dimensions. In triangular fillet welds the ratio of the leg of an isosceles right triangle to the normal to its hypotenuse is happily greater than is required.

Reverting now to the thermal effect of welding: The heat is conducted across a much narrower belt than is commonly supposed. While the temperature of the arc is high, its duration at any point is brief. The base metal is raised to a bright red color over a belt whose width varies with its thickness and with the volume of the weld. It then cools freely in the air. This means that near the weld the piece undergoes precisely the same treatment as would normalize mild steel.

While this indicates that the welding operation has no harmful effect on the base metal, and why rupture (in the base metal) is more apt to occur near the weld rather than at a remoter point, it does not explain why rupture is less frequent in the weld itself. The reason is that while ordinary weld metal has a somewhat lower ultimate strength than the base metal, it has a much higher yield point. Therefore, necking, and consequent rupture, is apt to start in a normalized part of the base metal rather than in the weld.

3. *Can methods of making welds by different processes be standardized?*

The answer to this question is "Yes"! Specifications covering the making of welds by the direct current metal-arc process, and by the oxy-acetylene gas process, have

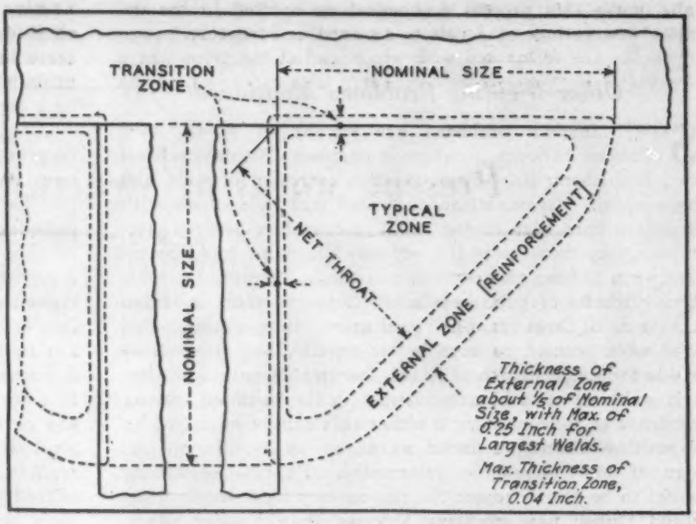
BORN in Cardiff, Wales, F. T. Llewellyn was educated in Welsh and English schools and came to this country late in 1890. *His first position was in the structural steel department of the Gillette-Herzog Mfg. Co., Minneapolis. Later he was representative of this company in New Orleans, La. He supervised the first skeleton tier building in that city and the first steel frame building in Louisiana. From* 1906 *to* 1917 *he was engineer in the New York office of the Carnegie Steel Co., devoting his attention to the development of new products. In* 1917 *he was loaned to the Emergency Fleet Corporation and devoted his attention to the simplification of steel requirements for ships, and in allotting steel to shipyards. From* 1919 *to date he has been attached to the president's office of the United States Steel Corporation, and has concerned himself with new products, especially in the structural field. Mr. Llewellyn is a member of many of the American technical societies and clubs, and is president of the American Welding Society.*

already been prepared by the Structural Steel Welding Committee. Already we are using ⅜-in. fillets as standard in much the same way as ¾-in. rivets have been standard.

4. *Can values be fixed on some unit basis for the strength of the more usual types of welded joint?*

To this question a qualified answer is given. For quiescent static loads, "Yes"! For dynamic loads, "Probably Yes"! Welded joints subjected to considerable shock require further investigation. It does not follow that welded joints are unsuited to resist shock. Many structures are now in use where they perform this function very efficiently. It is a fact, however, that knowledge as to their precise behavior under shock is limited, and the need for further study along this line is urgent.

In order that working values may be useful they must be expressed in units that can be readily checked in shop or field operations. For butt welds the throat area is a suitable criterion, disregarding any reinforcement. For fillet welds in practice it seems advantageous to express values in terms per linear inch for each size of weld. The figure shows gages used by the Newport News Shipbuilding & Drydock Co. for some years, and the method of application. Checking the number, length and location of welds is also essential.

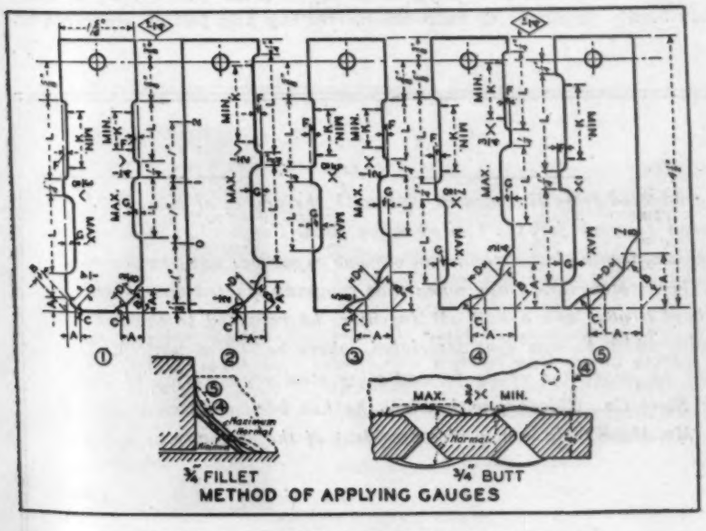

TRANSITION ZONE
NOMINAL SIZE
NOMINAL SIZE
TYPICAL ZONE
NET THROAT
EXTERNAL ZONE (REINFORCEMENT)
Thickness of External Zone about ⅛ of Nominal Size, with Max. of 0.25 Inch for Largest Welds.
Max. Thickness of Transition Zone, 0.04 Inch.

Diagrammatic Section Through Fillet Weld

Allowable working unit values for fillet welds appear to be crystallizing at about 28 per cent of the ultimate strength under shear of the neat weld metal. This percentage assumes the depth of throat to be the minimum permitted by the gages. Thus, a value of 3000 lb. per linear inch is in frequent use for the popular ⅜-in. fillet. Since the yield point of structural steel is much lower than that of weld metal, the same factor of safety (figured on the ultimate strength) will give a bigger margin in the joint before permanent set occurs under working loads.

5. *Is there some way of determining the reliability of the completed weld?*

This is doubtless the most important question to be answered. From a rigorous standpoint Mr. Llewellyn believes that we can no more be certain that a specific portion of weld is sound, without destroying it, than we can tell whether a specific rivet fills the hole, without destroying it. Expressed conversely, it is just as possible to determine the reliability of a completed weld as it is possible to determine the reliability of a riveted joint.



Gages for Fillet and Butt Welds

We have confidence in rivets, and rightly so, not because the inspector's hammer rings true when applied to their heads (it is well known that a poorly driven rivet can be given a resonant head), but because we have used them with satisfactory results over a long period. Confidence in rivets has been a thing of growth. Thirty-five years ago all structural specifications limited field rivets to only two-thirds the value allowed for shop rivets. Today that classification has gone, and the distinction is between hand-driven and machine-driven rivets. We have acquired confidence in the machine-driven rivet.

"If welding is to be considered seriously as a structural tool, similar confidence in its results must be given opportunity to develop." He cited the following means for attaining that end: (*a*) By familiarity with the process in the shops. (*b*) By removal of short sections of the joint for examinations, (*c*) By proof loads. (*d*) By testing the welder's qualifications. (*e*) By using proper welding wire.

6. *Can the welding operations be done at a competitive cost?*

With fabricating shops organized along existing lines in which welded jobs are undertaken only occasionally, competitive costs can be secured (*a*) on low beam-and-column buildings whose details are sufficiently simple to permit the rolled steel members to be shipped unfabricated from the mill direct to the site; (*b*) on shop-welded structures where savings in weight are securable, notably in truss-work wherein the net section of tension members is a criterion and where gusset plates and other expensive details can be largely eliminated; (*c*) on existing bridges and other structures which require reinforcement to meet added loadings.

On the other hand, competitive costs may not be securable on tall beam-and-column buildings, whose details require shop preparation, until such time as there is enough business of this character to occupy a shop continuously.

"There is a class of tall beam-and-column buildings which can be welded with advantage, regardless of present costs. This class embraces additions to buildings already occupied, where the elimination of noise during construction has real monetary value. Hotel owners are becoming alive to this feature and it is also a factor in some other commercial buildings, as well as in the case of hospitals and colleges. The saving of space during alterations, and the smaller amount of demolition made possible by welding,

also make this process economical as applied to the detailed connections of a new to an existing structure."

Other Welding Problems Mentioned

SOME further problems are worthy of study, said Charles Schenck, production engineer, Bethlehem Steel Co., Bethlehem, Pa. First, relative corrosion of weld and base metal. His experience indicated that welds made with standard bare wire rusted rapidly; coated or covered electrodes were more resistant. Meanwhile paint could be relied upon to keep this corrosion in check. Second, the scattering results of published fatigue tests on welds indicated that none of them could be relied upon. Here again, coated electrodes seemed to give better results, but the matter needs to be investigated. Third, low impact values of electric welds seem to be associated with the so-called tearing tendency of weld metal. Whether this can be improved by depositing cleaner, sounder metal, or by a different design of joint should be determined. Fourth, something ought to be known about the reason why light welds withstand higher unit shearing stresses than heavier beads. Lastly, a similar study should indicate the reason why short welds are stronger, per unit, than long welds. Until these last two questions are answered, designers will rely upon "skip" welding, that is, getting the necessary strength by a large number of short, small fillet welds.

George H. Danforth, contracting engineer Jones & Laughlin Steel Corporation, Pittsburgh, said that his company had experienced great satisfaction in building welded structures when careful attention is given to details to simplify the design to avoid a mutiplicity of small parts, and to provide for mill variations in lengths and section size. He described in some detail the building erected for the Westinghouse company at Derry, Pa. (see THE IRON AGE, Oct. 6, 1927, page 944). More recent experience convinced him that that building had two times as many erection bolts as necessary. In one recent plan examined there were only 15 holes for connection of companion material required on 484 purlins. In his experience one welder per 100 tons of steel would give a good erection rate, especially since no scaffolding would ordinarily be required. Recently he had offered $5 a ton concession to be permitted to weld a 1-story shop building.

Steels Used by the Automotive Industry

BY W. J. MACKENZIE

AUTOMOTIVE steels in general use today are the nickel steels (S.A.E. 2000 series), chromium-nickel (S.A.E. 3000 series), chromium-molybdenum (S.A.E. 4000 series), chromium (S.A.E. 5000 series), chromium-vanadium (S.A.E. 6000 series), silico-manganese (9200 series), and the manganese steels (G.M.C. 1300 series).

The bulk of these steels are made by the basic open-hearth process. The figures for 1927 show that approximately 81 per cent of the total tonnage of alloy steels of all types was made by this process. This 81 per cent is to a large extent used by the automotive industry. Briefly, the basic open-hearth alloy steel process consists of producing a super-refined carbon steel, during or at the completion of which refining period the alloying elements are added.

Steels of Homogeneous Character

Close chemistry is not enough. To satisfy the industry (whose demand is for maximum freedom from segregation, the utmost in soundness, the minimum amount and size of non-metallic inclusions, controlled grain size, and all the other modern requirements of quality steel) much has been learned, but a great deal still remains to be worked out.

High physical properties are necessary to resist the wear, fatigue and complex arrangement of dynamic stresses which obtain in the members of a light-weight, high-speed motor car. As an example, we produce daily a common S. A. E. alloy steel for gears which, with a single treatment, shows physical properties of 275,000 to 300,000 lb. to the sq. in. tensile strength, and a reduction of area of 35 to 45 per cent, at a minimum Brinell hardness of 500.

The automotive engineer today designs his parts with full confidence that the steel specified, when properly treated, will have the desired physical properties—i.e., will do the work intended. This is the result of years of experience and cooperation with the steel maker. Present chemical and physical specifications have been the outgrowth of this experience.

Uniformity a Prime Essential

Steels of uniform properties are necessary to the manufacture of parts which are to be free from distortion, and of suitable physical strength after the mass-production methods of fabrication, treating and testing employed to-

AFTER being graduated from Harvard in 1913 with the degree of B.S., W. J. MacKenzie went to work for the United Alloy Steel Corporation, Canton, Ohio. He was associated with that company in various capacities until he joined the Central Steel Co. at Massillon, Ohio, when that company started operations. After spending about a year and a half at Massillon, he returned to the company at Canton with which he was first associated, where he stayed until May, 1918. In that year he joined the newly formed alloy steel organization of the Interstate Iron & Steel Co., Chicago, with which he has been connected until the present time. Mr. MacKenzie is now vice-president of the company.

day. The automotive manufacturer can meet his schedules, calling for thousands of cars a month, because he gets uniform steels.

He knows he can set his automatic machines to get hundreds of machined parts per tool; he knows that all he has to do is to set his heat-treating furnaces at certain prescribed temperatures and day in and day out he will get finished parts of uniform physical properties. He has made an immense saving in time and money. I know of one large manufacturer who uses cold drawn nickel steel instead of plain carbon steel, which has all the strength required, because he can get a greater number of finished parts at a lower cost from the alloy steel, due to its uniformity.

[The author here launches into a consideration of the more important of the S.A.E. steels, of which he gives a comprehensive table. He tells what each type can be expected to do, where it is employed and how it is heat-treated.—*Editor.*]

Specifications Not What They Might Be

IN discussion of Mr. MacKenzie's paper, Dr. John A. Mathews, vice-president Crucible Steel Co. of America, remarked that standard specifications usually are compromises and rarely are entirely satisfactory to either maker or user of the material. Ordinarily they do not result in furnishing the highest grade of material. The speaker quoted from typical specifications of a generation ago, in which demand was made that "all seams, slivers, slag, dirt, etc., etc.," be eliminated from the steel. More recently certain specifications have required that the steel be a "perfect steel." Any material which can be manufactured commercially can with strict interpretation of either of these requirements be rejected, and this might easily happen on a falling market or on a long inventory.

Preparations are being made by Engineering Foundation to study the entire range of alloy steels. When the survey of our present knowledge on the subject has been charted, there probably will appear certain gaps. These will have to be filled in by special investigations. Then, with considerable assurance, it will be possible to select specific steels for special purposes and not leave the matter so much to chance as at present. Purchasing agents now often make selections of material with which they have become familiar; this, in the first instance, usually involves having had it recommended to them by the seller. This practice is not in the interest of best work and should be abolished in favor of intelligent selection from known characteristics of the material.

Observations on European Iron and Steel Conditions

BY C. A. MEISSNER

ITALY, France, Switzerland, Germany and Luxemburg give a first impression of general recovery and improvement in living conditions, and certainly in many respects improvement in industrial conditions.

About 50 per cent of all rail ties in Germany are made of steel and it is proposed by the Government Railways to increase this proportion to about 66 per cent of the total. Great attention is paid to the manufacture of steel rails and fittings, and the road beds admit in many cases of heavy trains running 50 to 60 miles an hour. There are through trains of steel construction, commodious and comfortable.

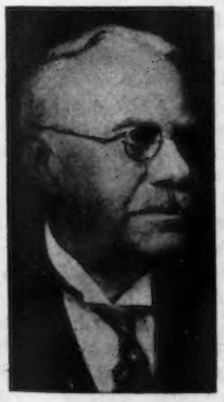
Rails up to 90 ft. 9½ in. are rolled, the long length being used more and more. All rails are straightened on roller straighteners, which seem to give satisfactory results and eliminate hand straightening, except for occasional twisted rails. Large section rails have about 0.5 per cent carbon and 0.40 to 0.60 per cent manganese.

An interesting feature in Italy, and really through a great part of Europe, is the intensive use of cable bucket systems carrying materials from the docks and stock piles to the plants. Also, in many cases, long-distance cable systems were seen for minerals, lumber and other materials.

Large Blast Furnace Outputs

At Hamborn furnaces, near Düsseldorf, daily average production through a year on 16-ft. 5-in. hearths, in good condition and with good ore mixture, has been as high as 835 tons. This they attribute largely to the open nature of the burden. Daily averages for a month are sometimes as high as 850 tons and have reached 920 tons. Productions of 950 to 1000 tons are occasionally made for a day or two. The present daily average production, because of poor ore mixture resulting from the Swedish mine strike, is 700 tons. Average production for a campaign is about 1,200,000 tons. Varying amounts of sinter are used.

On good ore mixture slag volume is about 1100 lb. per ton of iron. On present poor ore mixture it is about 1760 lb. On good ore mixture the coke rate is from 1716 to 1870



SINCE 1905, or for 23 years, Carl A. Meissner has been chairman of the blast furnace, coke oven and open-hearth committees of the United States Steel Corporation at 71 Broadway, New York. He received a degree of Ph.B. from the School of Mines of Columbia College in 1880, and in 1915 the same institution bestowed upon him the degree of M.S. His first position in 1880 was assistant chemist, Joliet Steel Co., Joliet, Ill., and between that time and his connection with the Steel Corporation in 1905 he held positions with the Brier Hill Iron & Coal Co., Youngstown, Ohio; Vanderbilt Steel & Iron Co., Birmingham, Ala.; Londonderry Iron Co., Londonderry, Nova Scotia; Dominion Iron & Steel Co., Ltd., Sydney, Nova Scotia, and other Canadian companies. He is a member of several American technical societies and has published a number of articles on technical subjects.

lb. per ton on larger furnaces, depending, of course, on age of furnace.

Blast temperature is generally 950 to 1100 deg. Fahr. throughout Germany; higher heats slow the furnaces down too much. Hamborn is using 1200 deg. Fahr. However, one plant at Saarbrücken, France, expects to go to 1550 deg. Fahr. on minette ores and sinter. The general feeling is that there is no limit to stove heat, up to what the furnace will take without slowing down.

Cleaning of blast furnace gas by electrical precipitation is arousing a great deal of interest throughout Central Europe. Among the reasons given for this interest are the following:

1. Power consumption of electric cleaning is about one-tenth that of wet washing.
2. Cost of sludge disposal from wet washers is high.
3. Difficulty of waste water disposition is serious in some sections.
4. Shortage of water at some plants makes wet washing objectionable.
5. Several plants are putting in turbo-blowers and so do not need such clean gas as would be required for gas engines.
6. The saving of sensible heat, even after gas is partially cooled in primary coolers, is considered to more than offset the extra moisture carried by the gas.

Ferromanganese at 300 Tons a Day

One blast furnace making ferromanganese at Meiderich is noted in Europe for its large production. Hearth diameter is 11 ft. 6 in.; coke rate, 4070 lb. per ton; production, 280 to 300 tons a day of 78 per cent ferromanganese. The stove heat is 1380 to 1425 deg. Fahr.; pressure, 13 lb. per sq. in., with whatever wind this pressure will allow. Furnace volume is 15,885 cu. ft.

Ores used are 60 per cent Indian, containing 49 per cent manganese and 5 per cent iron; and 40 per cent Caucasian. Slag contains about 12 per cent Mn and is used in blast furnaces for manganese addition.

The largest furnaces in Luxemburg make about 350 tons a day. Hearth diameter is 16 ft. 5 in. A furnace with 19-ft. 8-in. hearth is now being built at Dillingen and a production of 450 to 500 tons per day is expected from it. This furnace will have skip filling. Some minette ores used have 26 to 28 per cent iron, with enough lime to be self-fluxing. There are also silicious minettes which require lime additions or are mixed with limy minettes.

Tilting Open-Hearth Furnaces Used

The Hamborn open-hearth plant furnishes about 35 per cent of plant steel requirements, the other 65 per cent being basic Bessemer steel. Four 80-ton tilting basic furnaces yield about 100 tons each. Fans are used for blowing the air in, and for drawing out the waste gases. Large checker chambers are used, which take the heat out of the waste gas to about 600 deg. Fahr., so the waste-heat boilers formerly used are now blanked off.

Fuel is mixed by-product and blast furnace gas, averaging one part by-product to two parts blast furnace. No special valves are used, the by-product gas being put into blast furnace gas main in quantity desired, just before checker chambers, so that the mixture is heated.

At Hoentrop is the newest and finest open-hearth plant in Germany. The buildings are high and large, of reinforced concrete and steel construction, as are also the bins for storage of ore, dolomite, etc. There are four basic tilting furnaces, two of 120 tons, one of 180 tons and one of 200 tons capacity. Tilting is done by one 100-hp. electric motor per furnace.

Revolving overhead charging cranes are used, though admittedly slower than floor cranes. Scrap is stored in bins beside the furnace floor, and cranes load it directly into the charging boxes, which sit on a platform opposite each furnace. The whole charge is made up on this platform, so there are no tracks in front of the furnaces. Hot metal is stored in a mixer at one end, and carried to the furnaces by the pit crane, to be poured in at the tap hole.

Exceptionally heavy water-cooled port castings are used. Front walls, as well as back walls, are of magnesite brick and roofs of arched silica brick. They figure that flat suspended roofs are more expensive to install and repair. Three water-cooled pipes between water-cooled door frames serve to hold the front walls in place. Total brick consumption is 17.6 lb. per ton of steel.

Large checker chambers are used, about 23 ft. high, with 2½-in. checker brick and about 4-in. openings. The waste gas is about 850 deg. Fahr., so no boilers are installed. Checkers are heated to 2000 to 2200 deg. Fahr., measured by recording pyrometer with fire end projecting through top of the end wall.

Ladles of 60 to 70-tons are used in the pit, two ladles for small furnaces and three ladles for big furnaces each heat. Charges average 20 per cent pig iron and 80 per cent scrap; the cost of each is about the same. A typical charge on the big furnace is:

7,000 kg. cold pig iron
30,000 kg. hot pig iron
177,000 kg. scrap.

214,000 kg. total, or 214 metric tons

Manganese content of the pig iron is 4 per cent, because the large scrap charge only runs about 0.4 per cent manganese and they want an average of 1.5 per cent in the total charge for good steel. The steel all goes into seamless tubes with 0.40 to 0.48 per cent manganese, so they add some manganese ore in the bath before tapping.

There is a somewhat greater tendency to use tilting furnaces in Europe than in this country, due to some extent to the use of higher-phosphorus materials and the ability to regulate slag conditions more carefully. Such furnaces appear to answer their needs to somewhat greater advantage than the stationary type widely used here. The percentage of pig iron and analyses of materials used here are important factors.

Water-cooling of furnaces is not so widely practised as in America, though the more recently constructed units have made provisions for cooling. The newer units more closely approach American standard practice, the buildings being of heavy type, with ample provision for stocking and charging, and roomy pits and pouring platforms.

Outstanding features noticeable during the visits included a strong tendency to Americanize the plants; especially the blast furnace plants, by following our blast furnace lines, and, in some cases, our methods of construction. In the coke oven plants we saw a number of modern American type ovens, all built with the idea of utilizing all of the rich gas in the steel mills or for public service, and heating the ovens with either blast furnace or producer gas.

[*Abstracts of papers by H. J. French on "Steels Required in the Aircraft Industry," and by Dr. W. H. Hatfield on "Rust, Acid and Heat-Resisting Steels," had to be held for printing in a later issue of* THE IRON AGE.]

Commerce Year Book, 1928

A wealth of information regarding the physical state of the United States is contained in No. 6 of the series of Commerce Year Books, issued under the auspices of the Department of Coommerce, Washington. The volume includes 728 pages of statistically and graphically presented data, with explanatory text, and a 10-page index.

Production, employment and domestic trade occupy the leading position, with prices, foreign trade, agriculture, fuels, construction, metals, machinery, automobiles, rubber, textiles, leather, paper and printing, chemicals, transportation and banking and finance following, in that order.

Intensive study of a work of this sort would give to the reader a detailed knowledge of the resources of the United States and their exploitation that could scarcely be gained in the same amount of time elsewhere. This is Vol. 1, referring to the United States.

See Good Machine Tool Prospects

Outlook Found Promising at Convention for Business, for Further Standards, for Cooperation with Machinery Builders and for Better Trade Practices

MANUFACTURERS of machine tools held a successful meeting, the twenty-seventh annual convention of the National Machine Tool Builders' Association, at Sky Top Lodge, Cresco, Pa., Oct. 23 to 26, inclusive. It was successful from the standpoint of attendance, more individuals representing more companies being present than hitherto. It was successful also in a detail of prime importance—the meetings of the groups making different classes of machine tools, wherein were discussed trade practices, standardization and other topics spelling the advance of the industry.

In the general sessions, the items of chief importance brought before the membership were these: A suggestion that arrangements should be made to bring about a coordination among different groups of machinery manufacturers, to cover matters of common interest, this topic espoused in part by H. B. Kraut, vice-president Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.; an address by H. I. Shepherd, vice-president Guardian Trust Co., Cleveland, pointing out the avenue of desirable relations between the manufacturer and the banker; specific recommendations in respect to standardization as outlined by the association's standards committee; a further discussion on the cooperation among trade associations by Dr. Hugh P. Baker, manager trade association department, Chamber of Commerce of the United States, Washington, and the procedure in machine tool accounting as now in the hands of the association's staff cost consultant, Albert E. Grover.

Industry Is Notably Active

High spots of the achievements of the association and the machine tool industry in the past year were brought out in the annual report of the general manager of the association, Ernest F. DuBrul. These are in part as follows:

The association's index of orders for each month of the last nine has run decidedly higher than for any similar period since the post war boom. In eight months up to Sept. 1 the index indicated a greater business booked than in all of last year. "Just when things are looking the rosiest, we begin to hear that deliveries are being delayed because of lack of skilled labor. So now again, as in the past, when the industry is getting a good run of orders, a short labor supply becomes a factor limiting its production.

"General business is decidedly active, and so far as can reasonably be forecast now, this activity should continue for some months. At this time, when things seem most favorable, it is not pleasant to comment on signs and portents of an unfavorable nature; yet there are such and we should not neglect them. The stock market situation is one factor that probably will react unfavorably on business. It is mere prudence and not pessimism to base our policies on a theory that some sort of slump is not far off, and that it may be somewhat bad. Then if it does not come in the near future, or if it is not bad when it comes, we will be that much more to the good.

"The wise policy is to keep inventories close to demand, and if demand goes down to let inventories also go down. Experience has shown that even with the most careful scheduling the inventory of a machine tool company is a hard thing to control in proportion to a diminishing demand. When you see our index slipping off you can adjust yourselves to the general condition with sure knowledge."

Mr. DuBrul pointed out that group activity is increasing at a very satisfactory rate and that group statistics are increasingly in demand.

In referring to the engagement of Albert E. Grover, as the cost consultant for the members, he said Mr. Grover has a slogan "that is so good that I cannot resist the temptation to give it here. He advances and proves this thesis: 'Effort Expended on Inaccurate Costs is a Complete Loss.'"

Machine Tool Show Next Year

Reporting for the exposition in Cleveland next year, he said that applications for space began coming in as soon as the blanks were sent out on Sept. 15. "In less than three weeks these totaled 80 per cent of the space used last year. In a week more, the applications overran last year's space and before the fifth week passed the applications were 13,000 sq. ft., in excess of what we used last year. This again was without any solicitation. Numbers of our previous exhibitors have applied for more space than they used last year, and many applications have come in from concerns that had not been in last year's show. Everything indicates that our 1929 show will be another tremendous success."

As it looked at the time of the meeting the members of the association will need all of the 60,000 to 65,000 sq. ft. of the main building, while non-members have asked for some 9000 sq. ft. and 13,000 sq. ft. would be required for accessories, in the event these are admitted to the 1929 show. Decision has not yet been made as to what extra facilities will be taken for the excess demand, such as the 7000 sq. ft. arcade at the exposition building.

New Officers

Henry Buker, vice-president Brown & Sharpe Mfg. Co., Providence, was elected president of the association. H. E. D. Gray, secretary and treasurer of the Landis Tool Co., Waynesboro, Pa., is the new first vice-president, and C. C. Swift, manager of the Ohio Machine Tool Co., Kenton, Ohio, was elected second vice-president. A. H. Tuechter, president Cincinnati Bickford Tool Co., Cincinnati, succeeds E. A. Muller, King Machine Tool Co., Cincinnati, as treasurer.

C. A. Johnson, president Gisholt Machine Co., Madison, Wis.; E. J. Fullam, secretary and treasurer of the Fellows Gear Shaper Co., Springfield, Vt., and F. V. Geier, vice-president and secretary of the Cincinnati Milling Machine Co., Cincinnati, were elected directors for three years, taking the places of P. E. Bliss, the outgoing president; Henry K. Spencer, the retiring first vice-president, and Edward A. Muller.

Six Companies Admitted to Membership

Membership applications of the following companies were acted upon favorably: G. A. Gray Co., Cincinnati; Hall Planetary Co., Philadelphia; Hardinge Brothers, Inc., Chicago; Henry & Wright Mfg. Co., Hartford; Hill-Curtis Co., Kalamazoo, Mich.; and the Producto Machine Co., Bridgeport. The Buffalo Forge Co., Buffalo, and the Logansport Machine Co., Logansport, Ind., joined prior to the meeting. Two members were lost in the year, one by liquidation and the other by giving up the manufacture of machine tools.

Would Federate Machinery Makers

WHAT Mr. Kraut used as a text for an informal address on the subject of coordinating machinery manufacturing companies was the development within Germany. He spoke in some detail of the Verein Deutsche Maschinenbau Anstalten, known as the V. D. M. A., whioh is a federation of 13 associations of machinery manufacturers, including that of the machine tool builders. Incidentally, in the interest of export trade, the association has published a large catalog printed in English. The organization

dates from 1892, when it was established by a few of the larger machinery builders. Today there are 2700 firms identified with the movement, representing 93 per cent of the entire machinery manufacturing companies and employing over 700,000 men, with an annual production in 1926 of 1,250,000,000 gold marks. The potentialities of the case, he pointed out, may be apprehended when it is remembered that there are roughly 6500 machinery builders in the United States, employing 1,800,000 men and producing machinery valued at $2,000,000,000, and yet the industry as a whole is without a general organization and, as a matter of fact, some of the groups have none or only a loose organization.

These 13 groups in Germany cover, besides machine tool and mechanical tool builders, manufacturers of machinery in the following classifications: textiles, agriculture, locomotives, prime movers, pumps and compressors, etc., conveying machinery, paper, food, crushing, machinery parts, such as certain forgings, and special machinery, including chemical apparatus. Each of these groups has an association, as suggested. The general organization has offices in Berlin under the directorship of Karl Lange. There is an executive board of directors and a general or larger board of directors, and then committees dealing with foreign trade, import duties, raw materials, transport charges, reparations in kind (growing out of the war), bank questions, conditions of sales, exhibitions, cost accounting, accidents, industrial law, insurance, and statistics.

As showing the importance of the German institution, Mr. Kraut said that commercial treaties are negotiated by the German Government only after being considered by the association, and the same action is taken with regard to duties. The general association has a standard form of contract approved by all groups, and covering terms of sales, guarantees and engineering service. Ordinarily, payments on contracts call for one-third cash on ordering and the balance on the basis of a specific understanding, with the time for payment extended for six and sometimes 12 months. In the matter of exports, 50 per cent cash is required on placing the order and the remainder is sometimes not finally payable for 18, and sometimes as long as 24, months. General guarantees do not extend beyond six months from the date of shipment, and the agreements are specific as to the replacement of parts.

Mr. Kraut's talk was regarded as dovetailing into the movement under way among the secretaries of machinery trade associations, which met at Montauk Point, L. I., Sept. 29, to consider uneconomic practices common to makers of machinery and equipment and which group is to hold a second conference in Washington on Nov. 8.

W. S. Hays, secretary of the Power Transmission Association, addressed the meeting on the same general topic of coordinating relations among trade associations. He would establish an instrumentality of a group of advisory engineers representing the different fields. There are such questions to be aired as the scope and field of applications of leather, rubber and chain belt drives, and of pulleys and the like, the matter of obsolescence and the hunt for new uses of machines and apparatus.

Lathe Makers to Charge for Servicing

As the result of Mr. Kraut's talk, the association voted that a committee of five should be appointed to study the question of a standard form of contract applicable in the case of selling machinery through dealers as well as in the case of direct dealing. In this connection, Col. L. S. Horner, president Niles-Bement-Pond Co., told of the decisions of the committee on engine lathes. The 17 companies represented decided they would stand back of a six months' guarantee but that a charge of $15 a day and expenses would be demanded of a buyer for assistance in installing, demonstrating or servicing a machine.

A rather general discussion followed and the consensus of opinion seemed to be that special considerations in the case of other classes of machinery made it difficult to accept the rulings of the lathe committee for general application to other groups. In passing, it was emphasized that there was a valuable psychological effect obtained when a machine was shipped with a tag indicating by the inspector's signature that the machine had been duly inspected. It was also held that undue demands were also likely to be checked by having the tag carry a statement of the guarantee clause.

Will Supply Easily Mounted Roller Bearings

Roller bearing design came in for special attention in the report of the association's standardization committee, A. L. Stewart, chairman, and W. L. Miller and S. A. Einstein. The following covers the major items of this meeting's consideration of standards:

It was voted on the proposal of the committee that all projects looking to the standardization of machine tool elements which involve engineering consideration of construction details should be carried through by the group of machine tool builders directly interested and should be worked out within that group before submission to the American Standards Association. The matter of colors for machine tools, being a question very largely of user interest, standardization in this particular, it was voted on the committee's recommendation, was referred to the sectional committee on small tools and machine tool elements operating under the American Standards Association procedure.

The committee reported that a design of roller bearing has been worked out to provide one of cheapened cost and capable of being mounted as easily as a plain bearing. A large roller bearing company, it appears, has prepared a list of sizes conforming to the existing standard shaft diameters and is prepared to furnish the bearings from stock at prices of standard stock bearings.

In regard to spindle end standardization the committee made the following recommendation which has been approved by the association's board of directors: The different groups affected (lathes, turret lathes, automatic lathes, automatic screw machines, grinding machines, milling machines and drilling machines) should coordinate action by a joint committee having one representative from each group; this joint committee to determine the spindle ends which are applicable to more than one type of machine and to strive to settle on as few spindle end standards as possible.

The committee recommended that the different groups consider test codes to cover the situation arising when users undertake to reject machines as not being sufficiently accurate, such codes to cover methods of testing but not standard tolerances.

Trade Association Work Constructive

A BROAD picture of the place and value of trade associations was drawn by Dr. H. P. Baker, manager of the trade association department of the Chamber of Commerce of the United States, Washington, in an address on "What Trade Associations Mean to Industry."

Tangible benefits, he pointed out, must be based on intangibles, such as good fellowship and confidence, which usually constitute the chief values in the early history of a trade association. If you have developed confidence, you are in a position to go ahead with the tangibles, he said. Among the tangibles discussed were correct cost keeping methods, cooperative research, and simplification and standardization.

In speaking of the promotional work of the new trade association department of the United States Chamber of Commerce, Dr. Baker said, "We want to get across the idea that trade associations are doing sound and constructive work, work that is of value to the consumer as well as to industry."

The "Chicago" plan of appraisal for used machine tools was outlined by E. P. Essley, E. L. Essley Machinery Co., Chicago, at the last session of the convention. J. R. Porter, Marshall & Huschart Machinery Co., Chicago, and president of the Associated Machine Tool Dealers Association, also spoke briefly on the subject, indicating that endorsement of the plan by the machine tool builders would help in extending it to other districts.

That exports of machinery will continue to increase was a belief expressed by W. H. Rastall, chief of the industrial machinery division, Department of Commerce, Washington, in

Officers of the Machine Tool Builders' Association: (from Left to Right) Henry Buker, President; H. E. D. Gray, First Vice-President; C. C. Swift, Second Vice-President; A. H. Tuechter, Treasurer; and E. F. DuBrul, General Manager

speaking on the export situation at the last session of the convention. German influence in foreign markets appears to be weakening and Swiss and English influence increasing, he said.

Machine Tool Cost Accounting Methods Discussed

THAT "effort spent on incorrect costs is a complete loss" was emphasized by Albert E. Grover, staff cost consultant of the National Machine Tool Builders Association, in a paper on "Some Important Points in Machine Tool Cost Accounting," which was presented at the third general session of the convention. Active interest in the cost finding plan proposed by Mr. Grover, which includes production center burden application, was reflected in the discussion of his paper.

It was pointed out that the first consideration of every machine tool builder is profit, and the sources of that profit. "First we arrange the accounting system so that our profit and loss statement will show classes of profit, then segregate the profit accruing from manufacturing and marketing into classes of product, further segregating to individual units where the circumstances warrant."

Use of the current market on materials, labor and burden in figuring costs of current sales was advocated. In this connection Mr. Grover said: "Would it not be better to charge our costs with the market price prevailing when we use the material in manufacturing, and charge the difference between that amount and the actual cost to 'purchasing profit,' provision for which class of profit is made on the profit and loss statement?"

Buildings and equipment, the next two items on the statement, were said to be the differences between depreciation taken into costs on reproduction values and depreciation computed on cost of acquisition. "By setting up this amount as a profit we are able to charge depreciation on replacement values to production operations through our regular accounts, and at the same time satisfy the rulings of the internal revenue bureau," said Mr. Grover. "In effect we are reporting depreciation on cost values. We are also displaying to our officers, monthly, advantages in profit due to having purchased buildings and equipment below the market of today.

"Here again, is it not better to charge our costs with the present value of the utility we are consuming for the consumer's benefit, and show the difference between that amount and the acquisition cost as a purchasing profit, which it really is?"

It was held that the cost of maintaining excess capacity is not a proper charge to operating expense; including it in the burden application will increase the cost figures. "Competitors who do not have expense of excess capacity naturally have no such item to reckon with," he said. "Showing this segregation on the monthly statement, of loss due to excess capacity, often spurs the organization to more effective sales activities."

Production Center Burden Application Advocated

In the plan of distributing costs shown by Mr. Grover, burden is charged to manufacturing cost on the basis of normal operating hours of production centers through which the individual parts and assemblies flow. "Only plants manufacturing one article and one size of that article can secure accurate costs of finished product by distributing manufacturing burden on the basis of the direct labor or direct labor hours represented in each article," he said. "However, that result would be an unsound basis on which to establish a selling price if the cost of any excess capacity is included in the burden rate calculations."

In the general plan of burden application advocated, the plant is divided into departments, including in each department only such area and equipment as required to perform one class of work.

The burden cost of each department is divided into three classes, representing the bases of distribution necessary to state correctly the cost of operations on the product. These classes are: *1*, Buildings, a place for the man to work; *2*, equipment, tools for the man to work with; and *3*, general supervision and clerical effort necessary to plan and record their activities; also supplies and other expenses in maintaining working conditions in the departments.

Building Expense Distributed to Production Centers

Building expense consists of depreciation, taxes, insurance, interest on investment in and repairs to buildings; also lighting and heating. The total cost of furnishing a place for the men to work is distributed to production centers on the basis of the area occupied by each.

Equipment expense consists of depreciation, taxes, insurance, interest on investment in and repairs to machinery and tools; also power. Depreciation, taxes, insurance and interest on investment are allocated to production centers on the basis of the reproduction values of machinery and tools. Repair costs, both material and labor, are charged directly to production centers.

General expense consists of supervision, taxes, insurance, interest, supplies, indirect labor, office salaries, etc. Taxes, insurance and interest cover fixed expenses on investment in inventories. Indirect labor does not include supervision and office salaries. All general manufacturing expenses are distributed direct to production centers.

The sum of building, equipment and general burden applications to each

production center, divided by the normal operating hours of the center, will result in a rate of burden that is practical to use in cost and estimate calculations.

Methods that do not comprehend the basis of distribution outlined in the paper were said to be faulty, and dangerous to the effective use of costs in establishing sales policies.

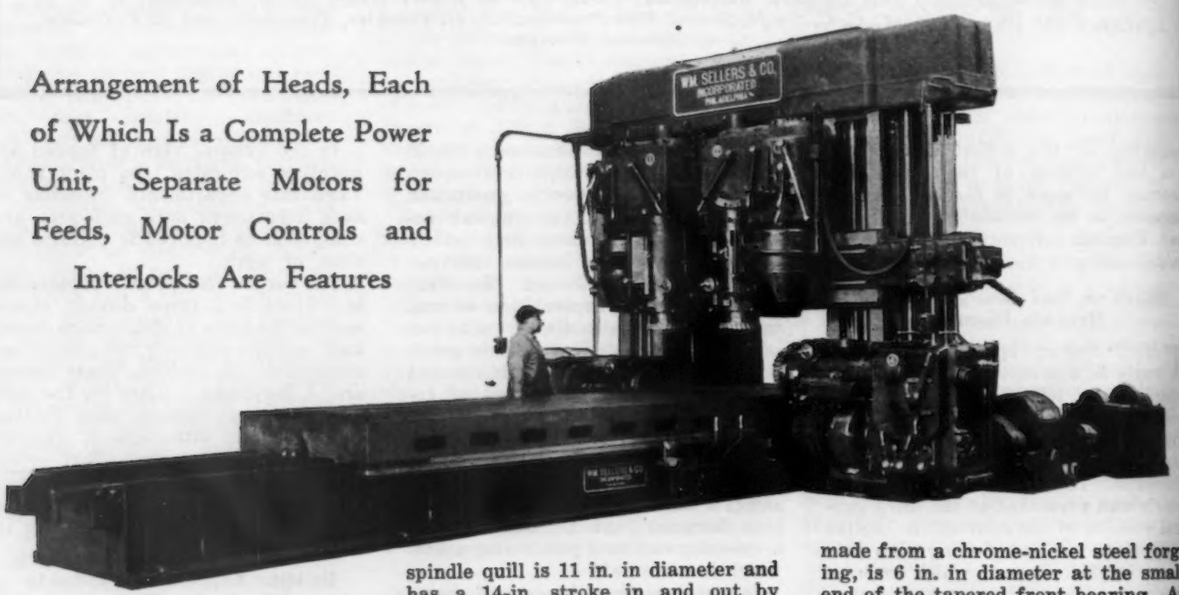
Comparisons of the results obtained by various methods of burden distribution formed an illuminating part of Mr. Grover's paper. Distribution of burden on the basis of direct labor was said to have all the irregularities of the blanket production-hour method, with the wages paid to machine operators added. "There is absolutely no relation between operator's compensation and the cost of running the machine," he said. "Of all the inaccurate methods of burden distribution this method is the most unreliable."

Urges Budgeting One's Business

The address of the banker, H. I. Shepherd, emphasized that "we are coming into what may be termed a period of glorification of the properly analyzed financial statement, showing the history of business operation recorded in the usual control figures." The ability to budget or to forecast operation in business, he urged, begets confidence. It begets confidence on the part of the management of the business itself and on the part of the banker who is called upon to extend a credit which must rely for its security and its ultimate liquidation upon performance in business.

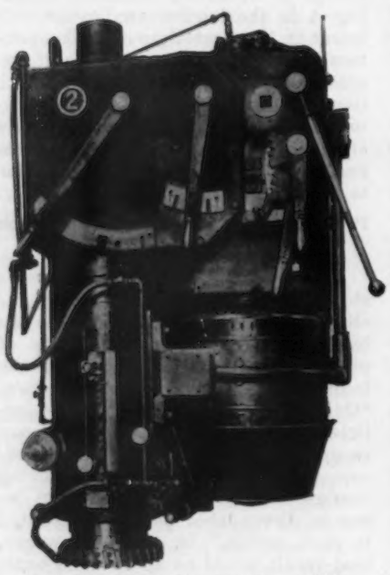
New Planer-Type Milling Machine

Arrangement of Heads, Each of Which Is a Complete Power Unit, Separate Motors for Feeds, Motor Controls and Interlocks Are Features



PLANER-TYPE milling machines in a variety of sizes are being placed on the market by William Sellers & Co., Inc., Philadelphia. The machine illustrated will take work 64 in. wide between the cutters on the side heads and 60 in. high between the table and the cutters on the cross-rail heads. It will mill work 20 ft. long. Bed, table, uprights and cross-rail are of massive construction to provide a rigid support for work and cutters. The machine is not an adaptation from planer design, but is made from entirely new patterns and is designed to resist the particular strains encountered in milling.

An outstanding feature is the design of the heads. The heads on the cross-rail and those on the upright are identical except for being right and left-hand. Each head is a complete power unit having its own 20-hp. motor drive. This arrangement requires only short shafts and spur gears in the drive and eliminates long splined shafts, bevel gears and worms. All gears in the heads are of chrome-nickel steel, hardened. Shafts are also of chrome-nickel steel and are carried in ball or roller bearings, with the exception of the spindle. The spindle quill is 11 in. in diameter and has a 14-in. stroke in and out by power or by hand. The spindle, made from a chrome-nickel steel forging, is 6 in. in diameter at the small end of the tapered front bearing. At slow speed it is driven by a 16-in. diameter gear through multiple splines milled in the spindle.



Each Head Is a Complete Power Unit. Those on the cross-rail and on the uprights are identical except for being right and left-hand. The spindle quill is 11 in. in diameter and has a 14-in. stroke in and out by power or by hand

Feeding of Heads and Table Is by Independent Motors

Feeding of the heads is by independent motor and speed reducing box, which includes one change of gears, the motor and box being located at the right-hand side of the upright. All feeds from 1 to 4 in. or 4 to 16 in. are controlled by a field rheostat, so that small variations in amount of feed may be obtained.

Each head is provided with a stainless steel scale graduated in thirty-seconds of an inch. An adjustable pointer moves with the spindle and measurements may be read accurately on the scale. For closer readings, an indicator may be made to move with the quill and by contact with a block located on a pad on the head, thousandths of an inch or less may be measured. The table is provided with stainless steel scale and adjustable vernier allowing readings to sixty-fourths.

Table feeds, provided by an independent motor and gear unit, range from 1 to 16 in. per min. Rapid traverse is at 20 ft. per min. Variations in

table feed are also controlled by field rheostat and one gear change.

Use of separate motors for the feeds is emphasized as of marked advantage in milling irregular shapes, in that one feed may be employed without interfering with the other, and any combination may be used to give any angle of cut required. In milling the edge of irregular castings, such as turbine housings, the operator can vary the feeds to follow around the oval shape by the use of field rheostats and push-button stations, without moving from the operating position.

Power traverse for the heads and quills is provided by an auxiliary motor on top of the machine. Here again the machine is arranged for convenience, as one head may be traversed while another is being fed. This motor also raises and lowers the cross-rail. In mounting the motor half way between the two uprights the shaft running to each lifting screw is of the same length, which arrangement is intended to assure steady and accurate lift.

The cross-rail is of the box type with the back extended between the uprights, a construction that has been used for many years on Sellers boring mills and planers. The cross-rail slides not only on the face of the uprights but has a bearing on a vee at the back. A powerful clamp that may be operated by a single lever at the end of the cross-rail is provided.

The table, of deep box construction, is carried on one flat and one double-vee way. The double-vee construction, which is said to maintain accuracy under the heaviest side cuts, consists of a flat vee combined with a vee with walls inclined a very few degrees from the vertical. The table bears on the flat vee except in cases of excessive side pressure, when the upper vee holds the table in place. When there is no side thrust the upper vee clears by a few thousandths of an inch. Hold-down shoes are provided to keep the work table from lifting on the heavy side cuts. The table is driven by spiral pinion and rack, through herringbone gears from a change gear box. End thrust on the driving shaft is taken on ball bearings which may be adjusted conveniently from outside the bed. Oil is continually circulating through these bearings.

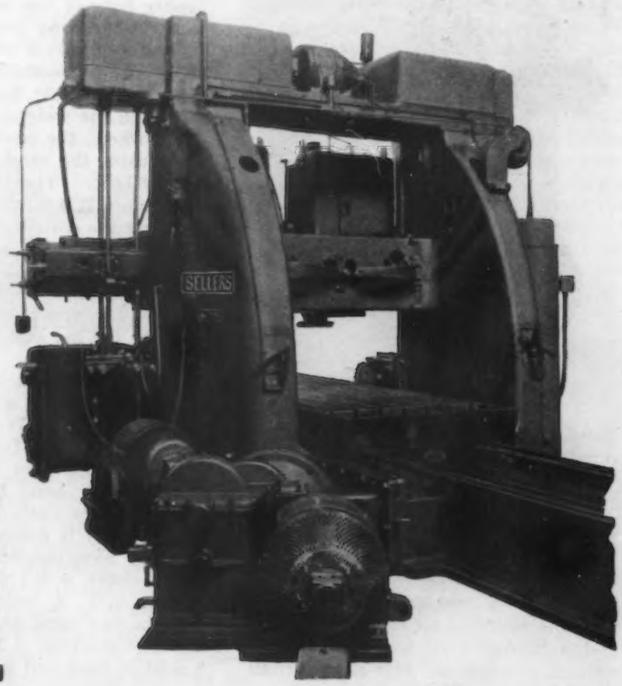
The bed is of closed-top type and is heavily reinforced between uprights. Inside the bed are located the tanks and pumps with their motors, a feature which eliminates piping that might be an obstruction and detract from the appearance of the machine.

Lubrication of the machine has been carefully worked out. Each head has its own pump and circulating system, and a pump is provided in the feed gear box to assure adequate lubrication of all bearings and gears.

Lubrication of the table ways is by force feed. The pump is driven by a separate motor and the arrangement is such that the pump must be started before the table feed motor can be started. This pump also assures continuous flow of oil through the spiral pinion box and the driving shaft bearings.

All motors are controlled from one panel and are operated by push buttons located at each side of the table. Interlocks are provided for the various motions; the feed motors, for instance, cannot be started in advance of the cutter motors. If a 30 per cent overload occurs on any one of the cutter motors, the feed motors will slow down until the load is lessened, when they will automatically speed up again. If a 50 per cent overload occurs on any one cutter motor the overload relay will stop it and the feed motors will stop instantly. Other interlocks, as well as safety clutches, are provided to make the machine as "foolproof" as possible.

Provision is made for cutting compound. The tank is located in the bed and has a gage glass on the outside. The pump, driven by a 1-hp. motor forces the liquid through the pipes in the uprights to the top of the machine, from which it is piped to each of the heads. An adjustable frame and two nozzles are provided for each cutter.



The Cross-Rail Slides On the Face of the Column and Has a Bearing on a Vee at the Back. The clamp is operated by a single lever at the right-hand end of the cross-rail. Power traverse for the heads and quills is by means of the auxiliary motor at the top of the machine

Feeding of the Heads Is Through an Independent Motor and Speed Reducing Box. Table feeds are provided by another independent motor and gear unit. All motors are controlled from one panel and operated by push buttons at each side of the table

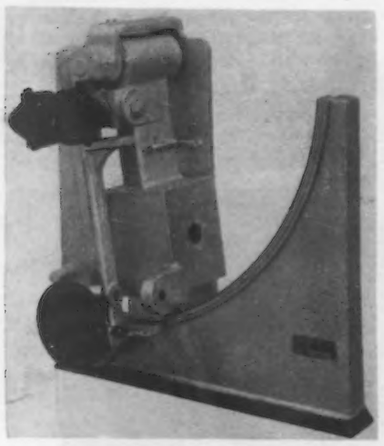
Machinery Merger to Involve Five Companies

The Foote Brothers Gear & Machine Co., Chicago, practically has completed negotiations for the acquisition of four other companies engaged in machinery manufacturing. Definite announcement of the details of the merger may be made in 30 to 60 days.

The General American Tank Car Corporation has announced plans for the formation of a European subsidiary to operate a fleet of railroad freight cars throughout Continental Europe.

New Sand Machine Makes Many Tests

A UNIVERSAL sand testing machine for measuring the green and dry bond strength of molding sand, cores, core pastes and clays has been brought out by Harry W. Dietert, Detroit. The machine can be operated by the standard American Foundrymen's Association compression method or by the shear control method.



Bond Strength of Molding and Core Sands and Other Materials Can Be Determined

The machine consists of three major parts—a substantial base, on which is mounted a pendulum weight, and a pusher arm. The pendulum weight swings on self-alining ball bearings, mounted on a carbon steel shaft to which the pusher arm is keyed. Various testing heads may be slipped into place on the pusher arm to make different bond tests. When testing in green bond the test head is placed in the lower hole of the pusher arm, this position giving a sensitive test to detect small changes in the bond. For the high reading dry bond test, the test head is placed in the upper hole of the pusher arm where a great breaking force is obtained.

The bond test is made by placing an A. F. A. permeability sand specimen between the test head of the pusher arm and the weight. By turning the hand wheel, the pusher arm is moved up causing the sand specimen to raise the weight. The stronger the sand the higher it will raise the weight. A rider on the scale shows the maximum height that the weight is raised. The strength of the sand in pounds is read directly from the scale, which has divisions far apart, making it easy to read in 0.2 lb., and to 0.02 lb. by interpolation.

As the machine is a dead-weight testing machine, it will stay in calibration indefinitely. Testing attachments may be provided for making the A. F. A. tensile core test, shear test, Mackin clay bond test, flexure core test and core paste tests. The testing capacity is green compression, 11 lb.; dry compression, 55 lb.; control green shear, 9 lb.; control dry shear, 45 lb.; A. F. A. tensile core, 160 lb.; Mackin clay bond and core pastes, 45 lb. The machine is 20 in. high, has a 8 x 20-in. base and weighs 134 lb.

The machine is built to high standards of precision. The taper holes in the nose of the spindle are ground with the spindles in place in their own bearings to assure concentricity between the spindle bearings and bore. All bearing ways have ample area and narrow guides to maintain close alinement. The nose of the spindle is heat treated and the spindle is mounted on an improved type of matched ball bearings. These bearings are prepared and mounted under sufficient initial load so that there is no evidence of radial or axial deflection of the spindle under ordinary operating conditions. They are tested for quietness and are required to be so nearly silent that the operator has no difficulty in detecting gear noise. Labyrinth construction seals are provided to protect the bearings. There are sight oilers for convenience in maintaining the proper oil level and the lubricating oil is filtered before it reaches the bearings.

The drive spindle, which is power driven, can be run in either direction. It is provided with a lock for use when tightening and loosening the arbor nuts. The driven spindle has a wooden lined friction brake for testing gears under load. The taper in the standard spindle is the same as in the 15 in. and 10 in. spiral bevel gear generators the arbors of which will fit the testing machine.

The pinion spindle head and the gear head column are adjustable horizontally on the frame by means of hand wheels which are graduated in 0.001 in. The drive head, or pinion head, and the column upon which the gear head is mounted are clamped to the frame at front and rear by separate clamps which operate with equal tension from a single lever. The ways are square gibbed. Guards are provided over the ways to protect them from dust and red lead.

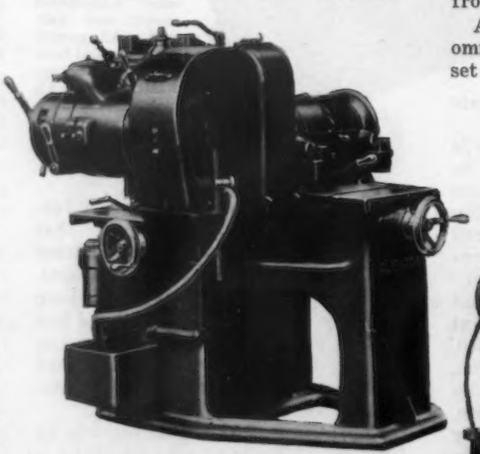
A 5-hp., 1800-r.p.m. motor is recommended for the main drive and is set in the base of the machine.

Combination Testing and Lapping Machine

THE Gleason Works, Rochester, N. Y., has brought out the 18-in. combination testing and lapping machine, illustrated, which is intended for use in the production of spiral bevel and hypoid gears. The gears are first tested after cutting, to show the proper tooth bearing, and then after hardening, for bearing and for noise. A brake on the gear or on driven head enables the operator to test them under load.

In lapping a pair of spiral bevel or hypoid gears the usual practice is to vary the settings so as to secure lapping all over the surface of the teeth. The design on which the machine illustrated is based is such that any adjustment or motion will be not in a horizontal or vertical direction only, but a combination of the two in proper proportions, so that the motion follows the tooth curve already generated. In this machine this motion is automatic and can be changed in direction to suit any job that may be put on the machine.

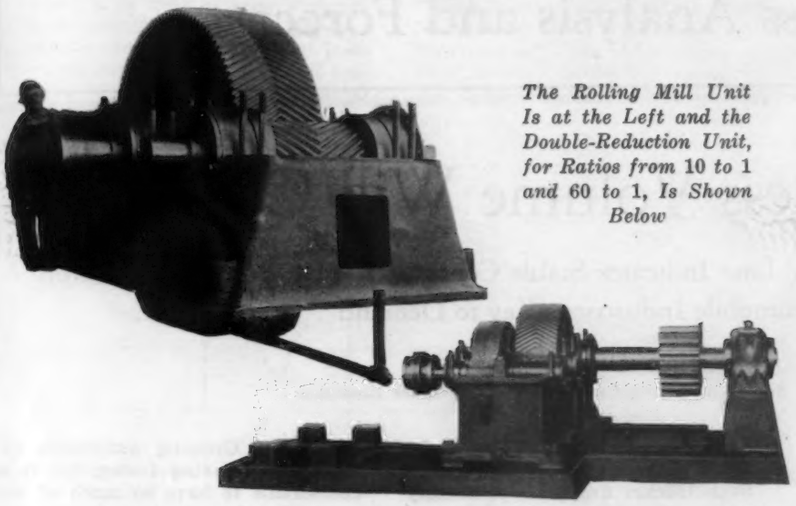
Gears up to 18 in. pitch diameter may be lapped on the machine. The maximum offset obtainable when testing hypoid gears is 3½ in. The maximum distance from the center of the gear spindle to the nose of the pinion spindle is 12 in. and the minimum distance is 3⅞ in. For lapping operations, guards, a self-contained pump unit, and reservoir for the lapping compound are furnished. The standard spindles on which the work is mounted are ground 2.292 in. at the large end with ½ in. taper per foot, but special pinion heads with larger size bores can be furnished.



Gears Up to 18-In. Pitch Diameter Can Be Lapped

Speed Reducers with Sykes Herringbone Gears

THE Farrel-Birmingham Co., Buffalo, has announced a new series of speed reducers having Sykes continuous tooth herringbone gears and anti-friction bearings.



The Rolling Mill Unit Is at the Left and the Double-Reduction Unit, for Ratios from 10 to 1 and 60 to 1, Is Shown Below

The roller bearings being of the type which combine journal and thrust capacity, both pinion and gear shafts are held from end float and are therefore protected from abuse from connected mechanism. It is claimed that this type of mounting is practicable with the Sykes gear since the apices of the teeth are central in the face of the gears around the entire periphery, and no end float either of gear or pinion is necessary.

High mechanical efficiency, 98½ to 99 per cent for a single reduction and 98 to 98½ per cent for a double reduction, is also claimed. The lubrication is said to be simpler than with the plain bearing units since in all cases the same oil may be used for gears and bearings and the splash and flood automatic system of lubrication is possible throughout the whole series. There is a considerable saving in space in the new design.

One illustration herewith is of a double-reduction unit suitable for ratios from 10 to 1 and 60 to 1, and powers between 5 and 200 hp. A typical outboard mounting where generated straight tooth gears are used for the final reduction is also shown.

A rolling mill unit suitable for powers between 300 and 500 hp. is also illustrated. The bearings are held in sleeves to facilitate adjustment and allow for shaft expansion. The case is of box section girder design extending from the center line of the shafts to the base.

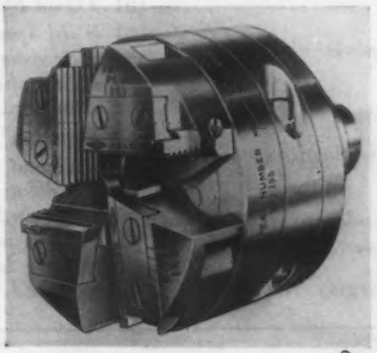
New Die Head for Use on Screw Machines

THE Landis Machine Co., Waynesboro, Pa., has brought out a new die head, named the Landex, for use on automatic screw machines.

This head, of rotary pull-off type, is opened by retarding the forward movement of the die head or die holder and is closed automatically by an attachment on the automatic screw machine. It is of carbon steel and is heat-treated throughout, and ground. The head is flexible on its shank to compensate for any misalinement in the machine or in the work to be threaded. In being supported on the front face of the head, the chasers are accessible for removal. The Landis "long life" chaser is employed.

A worm employed for adjusting the head to size is kept under the proper turning tension at all times, thereby eliminating the necessity of locking it for each adjustment for size. A micrometer dial is provided for further adjustments to suit close or free fits. The die head is locked within itself under service conditions by the engagement of two hardened closing pins and closing pin bushings. The spring for opening the head is located in the adjusting ring and has a uniform tension for all diameters.

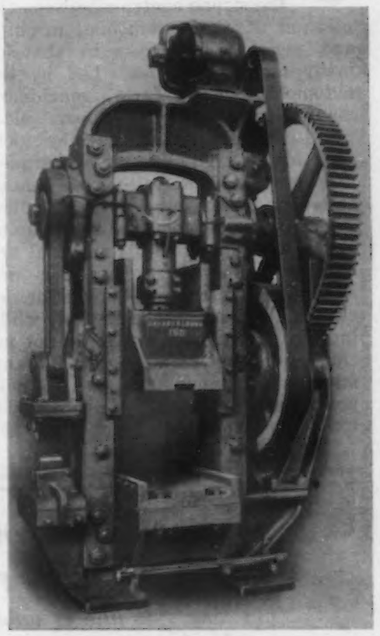
The heads are made in the ½, 13/16 and 1⅛-in. sizes and are graduated for bolt and pipe threads within their ranges. Each graduation is separate, and has its own index mark on the operating ring. All passages and openings into the interior of the head are covered under service conditions to prevent entrance of dirt and chips.



Introduces a Steel-Side Press

THE adoption of forged steel side-frames for the new Chambersburg trimming press aims at the practical elimination of side frame breakage as a hazard of press operation. The press now comprises strong I-section forgings with a heavy semi-steel bed frame and yoke, an oversized crank, outboard bearings used on all shafts, and a patented friction slip flywheel.

The friction slip flywheel serves to eliminate the hazard of the flywheel bursting, or the crank or gears being broken when an overload stalls the press. The energy developed by a sudden stop of the machine instead of expending itself as a strain on all moving parts is released by the flywheel slipping on its hub against friction. Adjustments to the press are rarely necessary after slipping.



The New Chambersburg Press Has a Steel Side and Friction Slip Flywheel

Other new features of this press are: Roller bearings on auxiliary shafts; directly renewable clutch jaws and cam (emphasized as a time saver on this most frequent of renewal jobs); a pitman adjustment that grips the threads over the length of the screw; high pressure grease lubrication to all bearings and surfaces; reduced floor space requirements and free accessibility from the rear.

This press comes with either single or double crank construction, and is built by the Chambersburg Engineering Co., Chambersburg, Pa.

Business Analysis and Forecast

Large Business Volume Will Continue

Sidewise Movement of P-V Line Indicates Stable Conditions—Too Much Reliance on Automobile Industry as Key to Demand

BY DR. LEWIS H. HANEY
DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

ONE outstanding point in the present business situation is the strong contrast between the position of the automobile, machine and metal industries with that of many other industries. Led by the automobile and farm machinery manufacturers, steel, copper, electrical appliances and machine tools show high activity and have continued to expand rapidly until very recently, at least. On the other hand, textiles, leather, shoes, paper, railroad equipment, building materials and coal are backward, and these industries are either operating at a low level or declining. The net result is that, while indexes of production that do not include building materials and many miscellaneous industries rise to new peaks, broader indexes of business activity, not arbitrarily weighted, either decline or remain about stable at relatively low levels.

Such indexes are those of factory employment and railroad freight tonnage. Both were lower in September than they were a year ago. This suggests the possibility that our prosperity, great as it is in a number of basic industries, is not so uniformly distributed as is desirable. This may indicate a lack of balance.

Something of this was in mind last month when we suggested that the present industrial situation is dangerously dependent on the automobile industry. It will be noted that the sales of the General Motors Corporation fell off considerably more than usual in September. The Ford output has passed Chevrolet production and suggests the possibility of disturbing competition in the low-priced automobile field. Growing automobile exports are a saving factor, but it is undesirable to have so much of our prosperity dependent upon any one industry.

Outlook for Business Is Excellent

For the present, however, the automobile, machinery, steel and copper industries are thriving and the upward trend of machine tool orders is a favorable omen. Building activity is still large, due to the heavy contracts of the past few months. Retail trade in general merchandise and in automobiles is active. The effects of high money rates and low yields on invested capital, in the way of restricting the flow of capital into industry, are not yet pronounced. Any maladjustments that exist are not serious or critical—except in the case

Factors in the General Business Outlook

Favorable Factors

(1) *The P-V line is stable at a rather high level, indicating demand and supply in fair balance, on the average.*

(2) *Retail trade is active and gained in September; wholesale trade improved.*

(3) *Automobile production and sales well maintained at high levels, considering the season.*

(4) *Money easier; gold imports check advances.*

(5) *Machine tool orders expand.*

(6) *Financial position of most leading companies strong.*

(7) *Stocks of commodities moderate in most industries; mercantile inventories light.*

(8) *Political uncertainties largely removed.*

Unfavorable Factors

(1) *Trend of building activity is downward; permits and contemplated new construction are low.*

(2) *Money continues relatively tight, restricting new bond issues.*

(3) *Commodity price trend turns downward.*

(4) *Farm situation is less favorable than supposed; decline in livestock prices.*

(5) *Trend of exports is downward.*

(6) *Wild speculation on the stock exchange and excessive brokers' loans take an undue share of the nation's capital and attention.*

(7) *Business failures are numerous.*

(8) *Railroad freight traffic and gross revenue are relatively low, also factory employment, indicating that total business activity is probably not up to that of a few leading industries, and is thus not well balanced.*

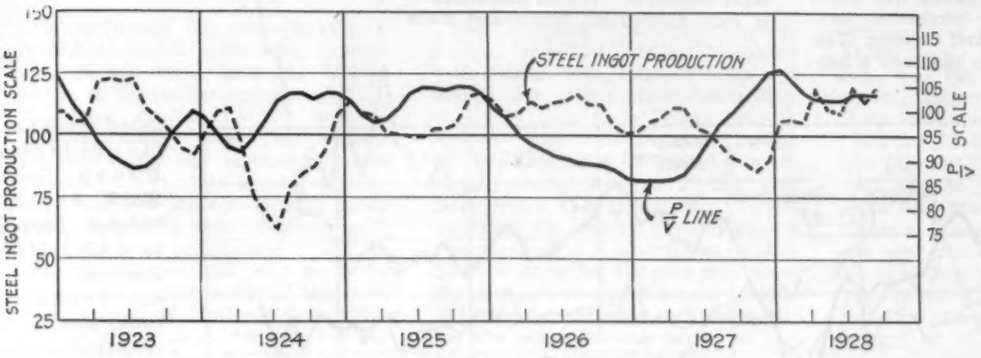
of the stock market. Money is even a little easier. The decline in commodity prices during the past few weeks has been moderate and does not seem likely to become a seriously disturbing factor.

In short, *in spite of some unfavorable possibilities and great excesses in speculation, the outlook for business indicates a stable and well sustained volume during the winter months, with earnings fair to good in a majority of industries.*

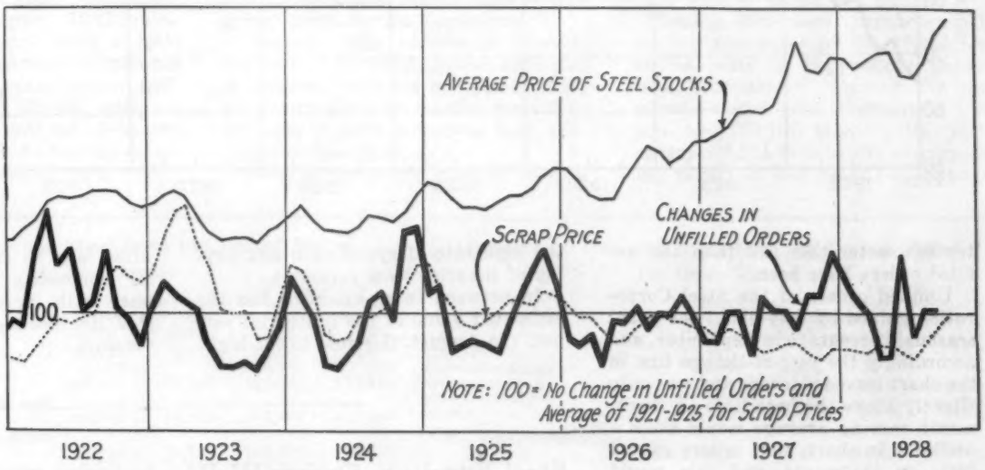
Demand Adequate to Absorb Output

THE trend of the P-V line is about sidewise, at a level considerably above normal. The action of this general business barometer means that the demand for commodities is adequate to absorb the quantities supplied at current prices. Of course, this applies to average conditions.

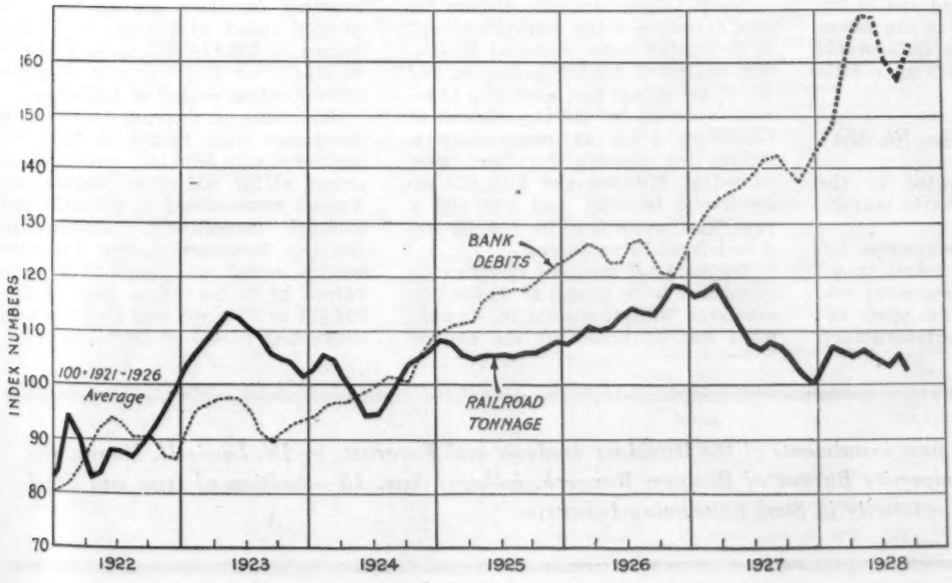
As usual, a fairly close relation exists between the trend of steel production and this barometer. As adjusted to eliminate the merely seasonal ups and downs from month to month, the underlying trend of steel ingot production was downward in May and June, then upward in July,



Sidewise Movement of P-V Line (Ratio of Commodity Prices to Physical Volume of Trade) Indicates Stable Business Conditions and Large Volume. Steel production (adjusted) continues high



Unfilled Orders Are Moving Narrowly About the Axis; Stock Prices Are Making New High Records and Scrap Prices Are Considerably Better



Bank Debits Are Inordinately High, Reflecting a Huge Volume of Speculation. Railroad tonnage, on the other hand, is at the lowest level, for the season, since 1924

since when the trend has been irregularly sidewise. There is no indication of a more than seasonal decline.

Steel Orders Gained Little on Shipments

WITH reference to the second chart, at least two points are clear: (1) Steel scrap prices have advanced sharply and the market is strong at this writing; (2) the average price of steel stocks has risen further and made successive new highs in September and October. The trend of scrap prices has been a better barometer this fall than the unfilled orders have been.

Unfilled orders of the Steel Corporation gained by only about the usual seasonal percentage in September, and accordingly the rate-of-change line in the chart moved sidewise and was only slightly above the base line. A three-month moving average would show a decline. In short, steel orders gained little on shipments, and this would usually indicate that no considerable expansion is to be expected; but speculation, both in scrap and in the stock markets, continues to run values up. In both cases the unfavorable reaction is only a matter of a little time.

Divergent Tendencies Shown

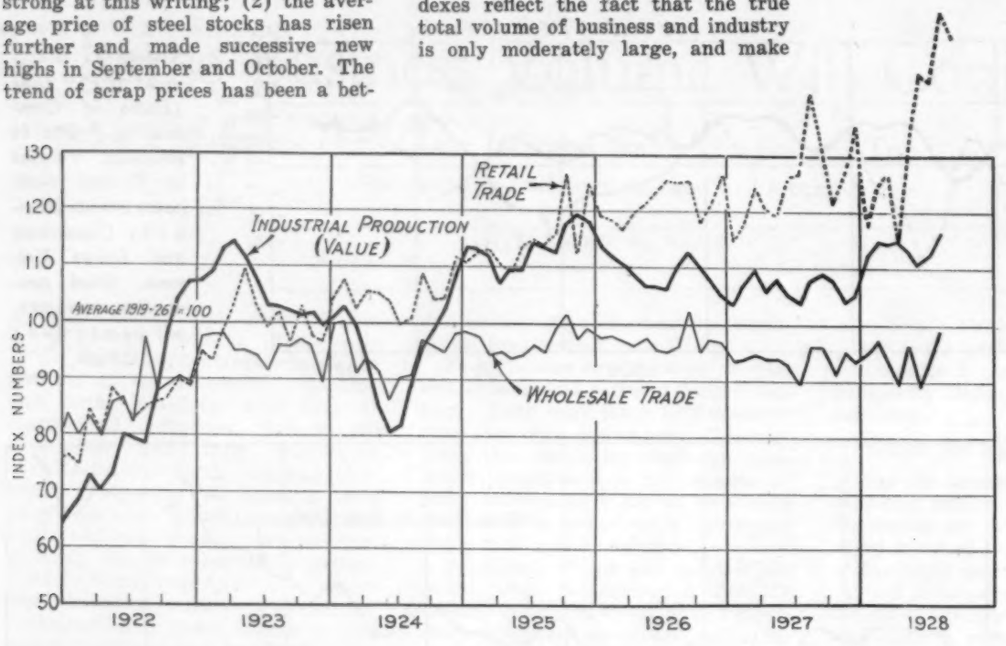
CONDITIONS illustrated in the third and fourth charts may be discussed together.

It will be noted that two curves are high—bank debits and retail trade. The former reflects an enormous volume of speculation on the stock exchanges; the latter, an extraordinary expansion in the chain store business. Neither accurately measures the true volume of business. But, after making all allowances, it may be said that both indicate that trade is active and relatively high, in comparison with industrial production.

Two other curves are low—wholesale trade and railroad freight traffic. Both are below a year ago, but show some recovery at the end. These indexes reflect the fact that the true total volume of business and industry is only moderately large, and make the high rate of speculation and buying of luxuries seem excessive.

In between these extremes lies the estimated value of the industrial output. In August, this rose to the highest point since December, 1925, exceeding even the 1923 peak. The trend is still upward and the output in terms of value does not seem excessive, even in comparison with department store sales (which are now our only reliable indicator of retail trade).

So long as the total value of production increases along with the quantity of production, the industrial situation may be called strong. Not until commodity prices cease to keep pace with increased output, and the P-V line declines, will a recession be forecast.



Retail Trade Continues to Show Heavy Gains, Which Are Attributed Largely to Chain-Store Business. Wholesale trade remains slow, while industrial production is progressing at the highest levels in three years

Steel Furniture Orders Well Ahead of Last Year

WASHINGTON, Oct. 30.—Orders for steel furniture in the "business group" in September were valued at $2,689,009, against $2,619,230 in August, and $2,367,857 a year ago, according to reports received by the Department of Commerce from 34 manufacturers. Orders for shelving furniture were valued at $799,850 and $863,420 respectively, in 1928, and $607,905 a year ago, according to reports received from 16 producers.

Shipments of business furniture in September were valued at $2,754,135, compared with $2,564,633 in August, while unfilled orders at the end of September were valued at $2,061,856, a decrease of $56,562 from unfilled orders at the end of August. Orders for business furniture during the nine months ended with September were valued at $26,494,877, an increase of $3,371,630 or 14½ per cent over the corresponding period of last year.

Shipments of shelving furniture in September were valued at $678,422, compared with $836,104, while unfilled orders at the end of September and August were valued at $753,813 and $734,365 respectively. Orders for shelving furniture during the nine months ended with September were valued at $6,938,395, a gain of $1,324,571 or 23½ per cent over the corresponding period of 1927.

Schedule of the next instalments of the ***Business Analysis and Forecast****, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows:* ***Nov. 15****—Position of Iron and Steel Producers;* ***Nov. 29****—Activity in Steel Consuming Industries.*

Large Export Movement Continues

September Total One-Fifth Below August, But 39 Per Cent Above Last Year— Imports Off One-Sixth

WASHINGTON, Oct. 29.—Making a decline of 59,241 gross tons, exports of iron and steel from the United States in September aggregated 228,056 tons, against 287,297 tons in August, which was the highest monthly outgoing movement since February, 1921, with a total of 393,329 tons. For the nine months ended September, 1928, exports amounted to 2,127,431 tons, an increase of 461,567 tons or 27.7 per cent over those for the corresponding period of last year with a total of 1,665,864 tons. The nine-month total of 1928 was but 55,760 tons less than the total for the entire year of 1927.

Imports in September, amounting to 57,782 tons, dropped 12,132 tons from those for August, with a total of 69,914 tons. Incoming shipments during the nine months ended with September, totaling 565,421 tons, reflected a decline of 5992 tons from the imports of 571,413 tons for the corresponding nine months of 1927.

The sharpest decline in exports during September when compared with August was in boiler tubes and welded pipe, which registered a drop of 13,957 tons from 30,948 tons in August. The second heaviest falling off in September exports was in scrap, which dropped 12,027 tons from 70,533 tons in August, the latter being the largest monthly export movement of old material on record. Scrap exports for the nine months of the current year, with a total of 423,287 tons, far exceeded such shipments for the corresponding period of last year, with a total of 175,824 tons. As in August, exports of scrap constituted the largest single item of outgoing shipments in September.

Average daily exports in September were 7602 tons, against 9260 tons in August, while the average monthly shipments for nine months were 236,381 tons in 1928, compared with 185,096 tons last year.

Most of the scrap exports in September went to Canada, which took 44,092 tons. Japan, taking 11,279 tons, was the heaviest overseas consumer. Exports of this commodity to Italy amounted to 1765 tons.

Of the 6721 tons of casing and oil line pipe exported in September, 3053 tons went to Venezuela, 1345 tons to Java and Madura and 732 tons to Canada. Colombia took 1140 tons of the 5403 tons of welded black pipe exports in September; Japan, 944 tons; the United Kingdom, 841 tons; Canada, 595 tons. Canada was the recipient of 14,015 tons of the 14,298 tons of skelp exported during the month, and also of 3004 tons of the 3290 tons of hoops and bands.

Taking 6888 tons, Japan was the leading purchaser of the 16,471 tons of tin plate in September; Canada took 4344 tons. During the nine months ended with September, Canada took 38,107 tons of tin plate, against 35,225 tons in the corresponding period of last year; but Japan led

Exports of Iron and Steel from the United States

(In Gross Tons)

	September		Nine Months Ended September	
	1928	1927	1928	1927
Pig iron	10,228	3,513	52,559	35,088
Ferromanganese	1,253	5	8,292	534
Scrap	58,511	30,124	423,287	175,824
Pig iron, ferroalloys and scrap	*69,992*	*33,642*	*484,138*	*211,446*
Ingots, blooms, billets, sheet bar, skelp	17,059	11,700	106,409	70,723
Wire rods	2,824	881	28,561	11,784
Semi-finished steel	*19,883*	*12,581*	*134,970*	*82,507*
Steel bars	11,785	7,323	108,969	83,294
Alloy steel bars	1,282	292	11,107	4,028
Iron bars	453	126	2,922	3,482
Plates, iron and steel	10,989	9,780	109,562	103,726
Sheets, galvanized	8,701	10,454	112,699	122,440
Sheets, black steel	12,038	7,184	140,568	125,874
Sheets, black iron	1,285	1,251	11,425	12,830
Hoops, bands, strip steel	4,249	2,253	42,055	33,280
Tin plate; terne plate	16,471	13,242	185,472	201,973
Structural shapes, plain material	13,377	13,366	132,092	106,818
Structural material, fabricated	4,272	4,251	67,438	49,533
Steel rails	16,466	11,897	161,130	137,076
Rail fastenings, switches, frogs, etc	1,518	1,807	34,260	25,311
Boiler tubes, welded pipe and fittings	16,991	18,024	193,266	206,787
Plain wire	3,069	4,011	33,902	25,838
Barbed wire and woven wire fencing	4,634	4,763	54,097	38,609
Wire cloth and screening	101	185	1,398	1,755
Wire rope	376	329	3,849	3,391
Wire nails	791	1,102	11,728	6,595
Other nails and tacks	460	600	7,316	6,311
Horseshoes	34	47	340	394
Bolts, nuts, rivets and washers, except track	916	849	9,716	9,020
Rolled and finished steel	*130,258*	*113,136*	*1,435,311*	*1,308,365*
Cast iron pipe and fittings	2,202	2,092	25,095	20,041
Car wheels and axles	2,345	1,802	12,407	13,828
Iron castings	545	892	8,350	8,752
Steel castings	379	387	7,223	5,722
Forgings	770	277	8,117	3,768
Castings and forgings	*6,241*	*5,450*	*61,192*	*52,111*
All other	1,682	1,344	11,820	11,435
Total	228,056	166,153	2,127,431	1,665,864

Imports of Iron and Steel Into the United States

(In Gross Tons)

	September		Nine Months Ended September	
	1928	1927	1928	1927
Pig iron	10,437	9,169	104,777	93,949
Ferromanganese*	4,660	1,897	34,677	21,111
Ferrochrome†	79	30	570	412
Ferrosilicon‡	123	126	2,963	6,563
Scrap	5,727	3,302	37,650	45,165
Pig iron, ferroalloys and scrap	*21,026*	*14,524*	*180,637*	*167,200*
Steel ingots, blooms, billets and slabs	2,193	841	16,614	9,419
Iron blooms, slabs, etc	....	....	4	....
Wire rods	1,076	1,328	12,130	11,415
Semi-finished steel	*3,269*	*2,169*	*28,748*	*20,834*
Rails and splice bars	891	2,773	12,982	14,620
Structural shapes	12,207	15,639	131,169	119,660
Boiler and other plates	606	24	4,668	3,248
Sheets and saw plates	2,347	2,451	19,912	11,939
Steel bars	7,358	9,018	70,932	72,466
Bar iron	161	168	1,613	3,164
Hoops, bands and cotton ties	1,944	2,387	15,543	26,449
Tubular products (wrot.)	3,084	1,434	31,513	43,206
Nails, tacks, staples	1,365	376	7,122	4,921
Tin plate	34	22	817	980
Bolts, nuts, rivets and washers	16	40	176	289
Round iron and steel wire	378	252	3,220	3,171
Barbed wire	762	404	3,121	3,486
Flat wire; strip steel	217	169	1,735	1,974
Steel telegraph and telephone wire	...	1	178	32
Wire rope and strand	98	139	1,255	1,799
Other wire	78	163	451	467
Rolled and finished steel	*31,546*	*35,460*	*306,407*	*311,871*
Cast iron pipe	1,778	6,076	47,314	69,345
Castings and forgings	163	242	2,315	2,163
Total	57,782	58,471	565,421	571,413
Manganese ore*	15,063	36,029	146,657	266,826
Iron ore	211,494	224,524	1,887,201	2,061,928
Magnesite (dead burned)	....	4,018	38,391	57,542

*Manganese content only.
†Chromium content only.
‡Silicon content only.

in both instances, taking 42,403 tons and 40,692 tons respectively. Peru took 962 tons of American tin plate in September.

Steel bar exports in September included 9392 tons to Canada. For the nine months, Canada took 71,737 tons, compared with 48,513 tons during the corresponding period of last year. Exports of plain structural material to Canada in September were 10,661 tons. For the nine months shipments of this material to Canada aggregated 109,345 tons, against 87,176 tons for the corresponding period of last year. Canada also was the principal buyer of steel rails, galvanized sheets, black steel sheets, plates and plain and galvanized wire in September and during the nine months.

Total exports to Canada during September were 126,102 tons, while for the nine months they were 854,620 tons, compared with 631,640 tons during the corresponding period of last year. Exports to Japan and Chosen in September were 36,376 tons, and for the nine months ended with September they were 298,019 tons, against 206,826 tons for the corresponding period of last year.

Aggregating 12,207 tons, imports of structural shapes constituted the principal item of incoming shipments in September, 6988 tons being furnished by Belgium, 3369 tons by Germany and 1377 tons by France. Of the 7358 tons of steel bars imported in September, 4391 tons came from Belgium, 1157 tons from France, 833 tons from Germany and 774 tons from Sweden. Germany supplied 1213 tons of the 3084 tons of "other pipe and tubes" imported in September, while 911 tons came from the United Kingdom, 261 tons from Canada, 245 tons from Czechoslovakia and 146 tons from Belgium.

Of the 15,063 tons of manganese ore concentrates imported in September, 4768 tons came from British West Africa, 4232 tons from Soviet Russia, 3780 tons from India and 2162 tons from Brazil. Norway supplied 3092 tons of the 4660 tons of ferromanganese imported in September; Canada, 1047 tons; United Kingdom, 462 tons.

United States Imports of Iron and Steel Products in September

(In gross tons)

Austria	19
Belgium	16,552
Czechoslovakia	276
France	5,414
Germany	9,743
Italy	24
Netherlands	4,457
Norway	3,366
Sweden	2,305
Switzerland	1
United Kingdom	4,191
Europe	*46,348*
Canada	7,629
Mexico	32
British India	3,758
Japan	15
Total	57,782

Sharp Decline in Machinery Exports

September 25 Per Cent Below August, But Nine Months 12 Per Cent Ahead of 1927—Imports Lower

WASHINGTON, Oct. 29.—Declining $11,389,853, exports of machinery of all kinds in September were valued at $32,913,382, against $44,303,235 in August. The decrease was reflected in most of the items, locomotives being one of the few exceptions. In September of last year exports of machinery were valued at $34,309,930. For the nine months ended September, however, a substantial increase over exports of the corre-

Machinery Exports from the United States

(By Value in Thousands of Dollars)

	September		Nine Months Ended September	
	1928	1927	1928	1927
Locomotives	$555	$99	$2,548	$4,404
Other steam engines	26	76	707	1,092
Boilers	194	58	995	667
Accessories and parts	39	101	463	427
Automobile engines	919	714	11,511	9,528
Other internal combustion engines	712	575	6,577	5,524
Accessories and parts	215	186	2,740	2,640
Electric locomotives	16	227	1,128	821
Other electric machinery and apparatus	507	449	5,824	5,685
Excavating machinery	291	459	2,242	3,606
Concrete mixers	68	92	80	882
Road-making machinery	210	147	2,245	1,703
Elevators and elevator machinery	266	334	3,208	3,661
Mining and quarrying machinery	1,014	906	10,116	10,082
Oil-well machinery	872	641	10,891	14,163
Pumps	520	559	5,916	4,802
Bending and power presses	363	75	1,732	391
Forging machines	73	96	610	772
Machine tools*	832	997	12,219	11,410
Other metal-working machinery and parts	383	336	4,494	3,551
Textile machinery	756	818	9,733	6,314
Sewing machines	495	335	6,387	4,322
Shoe machinery	95	116	1,339	1,244
Flour-mill and gristmill machinery	317	27	334	400
Sugar-mill machinery	510	958	3,295	3,228
Paper and pulp mill machinery	158	182	2,244	2,866
Sawmill machinery	48	54	672	596
Other woodworking machinery	115	102	1,389	1,055
Refrigerating and ice-making machinery	659	404	7,083	7,807
Air compressors	401	362	5,008	4,484
Typewriters	1,363	1,464	15,660	15,412
Power laundry machinery	122	30	877	1,171
Typesetting machines	347	352	3,371	3,247
Printing presses	374	401	4,453	4,673
Agricultural machinery and implements	8,498	8,690	90,182	72,456
All other machinery and parts	10,580	12,888	127,050	112,187
Total	$32,913	$34,310	$365,323	$327,273

*Principal details in another table.

Imports of Machinery Into the United States

(By Value)

	September		Nine Months Ended September	
	1928	1927	1928	1927
Metal-working machine tools	$35,516	$46,861	$433,247	$328,140
Agricultural machinery and implements	245,791	310,017	4,381,958	3,751,852
Electrical machinery and apparatus	154,497	121,699	1,143,902	1,341,345
Other power-generating machinery	3,256	655	9,249	8,726
Other machinery	780,238	611,144	7,270,990	6,445,898
Vehicles, except agricultural	280,430	257,610	2,323,625	1,774,464
Total	$1,499,728	$1,347,986	$15,562,971	$13,650,425

Exports of Power-Driven Metal-Working Machinery

	September, 1928		August, 1928	
	No.	Value	No.	Value
Engine lathes	56	$105,444	86	$243,694
Turret lathes	14	35,291	37	129,768
Other lathes	46	87,149	91	193,436
Vertical boring mills and chucking machines	6	14,093	17	36,068
Thread-cutting and automatic screw machines	47	57,212	58	98,399
Knee and column type milling machines	26	60,464	50	91,789
Other milling machines	37	65,975	60	101,102
Gear-cutting machines	23	66,719	48	141,695
Vertical drilling machines	19	18,157	44	86,024
Radial drilling machines	14	40,339	14	48,622
Other drilling machines	75	25,103	81	61,128
Planers and shapers	25	39,694	52	105,532
External cylindrical grinding machines	73	128,215	82	201,025
Internal grinding machines	27	55,797	54	146,143
Metal-working tool-sharpening machines	65	36,214	59	28,513
Total	553	$835,866	833	$1,712,938

sponding period of last year was made, being $365,323,328 as compared with $327,272,896.

Exports of industrial machinery in September were valued at $14,872,197, against $19,173,465 in August and $14,307,188 in September of last year. For the nine months ended with September they were valued at $164,361,944, compared with $150,425,125 for the corresponding period of last year. Exports of power-driven metal-working machinery in September were valued at $1,660,115, against $2,650,532 in August and $1,554,950 in September, 1927. For the nine months ended with September, 1928, the present and last year, exports were valued at $19,017,249 and $13,747,990 respectively. Exports of agricultural implements and vehicles in September were valued at $8,498,000, against $13,697,000 in August. Exports of power-driven metal-working machines listed in THE IRON AGE table totaled 553 in number, valued at $835,866, in September against 833, valued at $1,712,938, in August.

Imports of machinery and vehicles in September were valued at $2,226,391, compared with $2,729,543 in August and $2,198,617 in September of last year. For the nine-month periods the values were $21,194,752 in 1928 and $21,103,263 in 1927, a difference of only $91,489. Imports of industrial, office and printing machinery in September were valued at $1,428,520, against $1,829,834 in August and $1,370,674 in September of last year. In the nine months of 1928 and 1927 they were valued at $13,205,462 and $12,697,399 respectively.

Imports of machinery as listed in THE IRON AGE table were valued at $1,499,728 in September, against $2,081,751 in August and $1,347,986 in September of last year.

German Develops Steel Lattice Roof

American Company Has License to Use Pressed Steel Channels, Bolted Together, for Arenas, Public Halls, Etc.

LICENSE to manufacture pressed steel channels for a new type of roof structure developed in Germany has been acquired by the Blaw-Knox Co., Pittsburgh. Patented by Emil Moritz Huennebeck, it is known as rhomboid trussless roof construction. Since its development it has been manufactured in Germany by the Rautennetz-Gesellschaft M.B.H., Duesseldorf. As indicated in the accompanying reproduced photographs, the materials used throughout consist of pressed metal channels. They are of two standard lengths, one 5 ft. and the other 10 ft., pressed from No. 14 gage sheets, which are later galvanized.

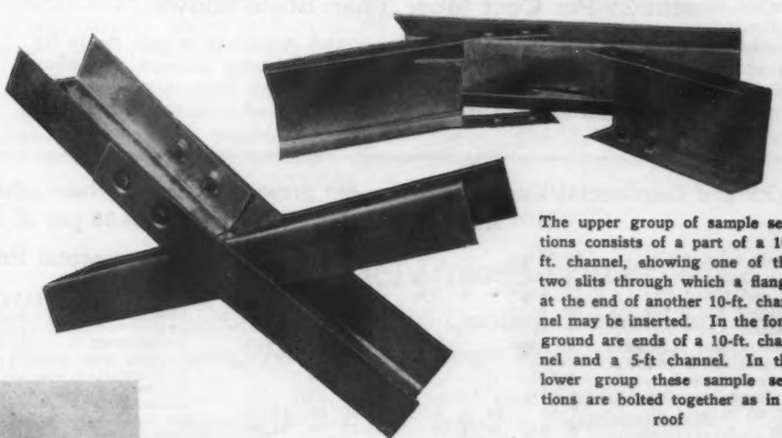
The web of the longer channel is cut away at each end, leaving an overhang of about 5 in. on one flange and 6 in. on the opposite flange at each end. Two countersunk holes for bolts are punched in each flange and the ends are sprung sufficiently to admit the abutting channel, to which it is bolted. The shorter piece has a slit close to one flange and substantially parallel with it, the slit to admit the overhanging flanges of the 10-ft. channel. The cut is shaped to permit the countersunk bolt holes in these flanges to pass.

In erecting the first experimental building, which was a barn with stables on the first floor and a large loft under the roof, a scaffolding was prepared for the erectors, but this was found unnecessary as the workmen were able to work quite rapidly by climbing up the lattice-like work as they bolted it ahead of them.

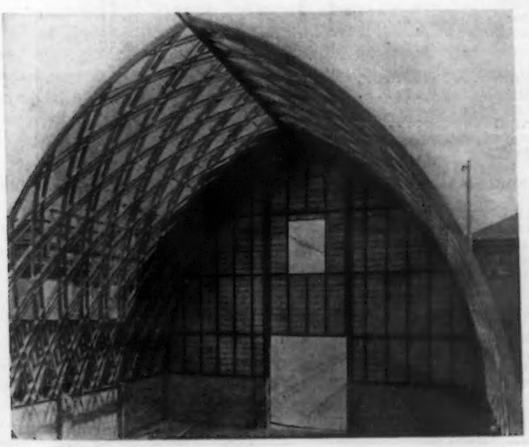
In spans of 30 to 60 ft., the rhomboid roof weighs about 2¼ lb. per sq. ft. and the standardized units in 5-ft. and 10-ft. lengths are of a broad U shape 5½ in. between the two 2⅛-in. flanges. These units weigh about 2½ lb. per ft. It is suggested by the designer that on larger spans somewhat larger dimensions and heavier gage sheets could be used. As yet no standardization of various weights for different designs has been attempted.

These roofs are being sold in Germany for barns and other agricultural purposes, but they are suggested as a desirable method of constructing aircraft hangars, large arenas and convention halls. The selling price in Germany is at present about 25c. per sq. ft. and the cost of manufacturing, including galvanizing, is placed at about $125 per metric ton, f.o.b. works.

This type of construction is claimed by its producers to weigh about 40 per cent less than the usual roofing, and loading tests made by the German manufacturers are said to show that the roof will carry double the load of a regular design.



The upper group of sample sections consists of a part of a 10-ft. channel, showing one of the two slits through which a flange at the end of another 10-ft. channel may be inserted. In the foreground are ends of a 10-ft. channel and a 5-ft channel. In the lower group these sample sections are bolted together as in a roof



This experimental barn constructed in Germany as one of the buildings in an all steel farm exhibition, shows the completed rhomboid roof ready for the sheets or other outside covering. Similar construction on a larger scale is suggested for aircraft hangars, large arenas, or factory buildings

To Use Malleable Castings on Ford Cars

The Ford Motor Co., Detroit, is now using approximately 15 lb. of malleable castings in its model A automobile and there is the expectation that this amount will be increased to 40 to 60 lb., as the Ford company has sent out blueprints covering 12 to 15 parts to both malleable foundries and drop forge plants for estimates. In the old model T Ford there were 90 lb. of malleable castings, which was reduced to 74 lb. about two years ago when the hubs were changed from castings to forgings. In the new model A forgings replaced malleable castings until quite recently. It is understood that Ford production has been delayed by inability to get desired deliveries on drop forgings.

European Steel Business Less Active

Buying Smaller Since Decline of Prices from Peak—French Expect Home Construction to Continue Through Winter

(By Cable)

LONDON, ENGLAND, Oct. 29.

PIG iron is quiet, but Cleveland producers expect to book further substantial tonnages before the end of the year. Consumers, however, are limiting their purchases to immediate requirements. Export demand is poor, but the threatened German lockout in November may bring improvement.

Hematite is still moderately active in the domestic market and Italian consumers are buying special grades. Foreign ore continues quiet.

Finished iron and steel markets are quiet generally. Although there is some export demand for heavy steel, sales are small. Rail and sheet mills are moderately busy.

Swan, Hunter & Wigham Richardson, Ltd., have a contract for a 15,000-ton floating oil factory to cost £275,000 ($1,336,500) from the Viking Whaling Co. Clyde shipyard joiners have ceased working overtime as a protest at the refusal of employers to increase wages by 5s. (83c.) per week.

Tin plate is quiet and prices are easier with makers seeking to book orders for shipment over the remainder of the year. Prompt and early shipment tin plate has sold at 18s. ($4.37) per base box, but for delivery next year the price has been 18s. 1½d. ($4.40) per base box, f.o.b. works port.

Galvanized sheets are steady, with a fair trade in small orders. Some mills are sold out until January, but others need tonnage for November shipment. Japan is buying a few small lots of light and heavy-gage black sheets.

Continental iron and steel markets are quiet, with prices steady following the recent decline. German production in September was 985,000 metric tons of pig iron, 1,190,000 tons of steel ingots and cast steel and 941,000 tons of rolled steel products. Italian output in the first half of this year was 204,000 metric tons of pig iron and 892,000 tons of steel ingots.

German Wages More Than They Appear

Bonus Payments to Married Men and for Overtime Represent 25 Per Cent More Than Scale Shows

HAMBURG, GERMANY, Oct. 13.—German steel producers claim that the wages quoted for German steel workers in the recent comparison of European and American wages made by the United States Bureau of Labor Statistics (THE IRON AGE, Sept. 20, page 732) do not represent those actually paid. It has been pointed out to the correspondent of THE IRON AGE in Germany, by the United Steel Works, Düsseldorf, and by the Federation of German Steel Manufacturers, that, while German wages are generally considered to be much lower than British, they are in most cases higher, both actually and relatively.

Actual wage payments to workmen are higher than a table of wage rates would show, as practically all steel workers are receiving the 25 per cent bonus for overtime work. In considering wage averages, the higher wages of foremen must be included. It is further explained that wages are relatively higher, as the cost of living in Germany is lower than in Britain and a majority of the workmen live in cottage dwellings provided for them by the companies at fixed rentals of 25 to 40 m. ($5.95 to $9.53) per month, buying food and other necessities from the company stores at low prices.

Wages paid to foremen, it is said, are considerably higher than in Great Britain and were, at the end of September of this year, 340 m. ($80.99) per month for a blast furnace foreman, 450 m. ($107.19) per month for a Bessemer converter foreman, 410 m. ($97.66) per month for an open-hearth foreman, 465 m. ($110.76) per month for a foreman of a bar rolling mill, 610 m. ($145.30) for the foreman of a sheet rolling mill, 330 m. ($78.61), for a foundry foreman. These wages are based on an hourly

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works with American equivalent figured at $4.86 per £ as follows:

Durham coke, del'd	£0 17¾s.	$4.31
Bilbao Rubio ore*	1 2s. to £1 2½	5.35 to $5.48
Cleveland No. 1 fdy	3 8½ to 3 9½	16.64 to 16.89
Cleveland No. 3 fdy	3 6	16.04
Cleveland No. 4 fdy	3 5	15.80
Cleveland No. 4 forge	3 4½	15.68
Cleveland basic (nom.)	3 5	15.80
East Coast mixed	3 10	17.11
East Coast hematite	3 10½	17.23
Rails, 60 lb. and up	7 15 to 8 5	37.66 to 40.10
Billets	6 2½ to 6 10	29.77 to 31.59
Ferromanganese	13 15	66.83
Ferromanganese (export)	14 0	68.04
Sheet and tin plate bars, Welsh	6 0	29.16
Tin plate, base box	0 18 to 0 18⅛	4.37 to 4.40
Black sheets, Japanese specifications	13 7½	65.00
		C. per Lb.
Ship plates	7 12½ to 8 2½	1.63 to 1.74
Boiler plates	9 0 to 10 10	1.92 to 2.25
Tees	8 2½ to 8 12½	1.74 to 1.84
Channels	7 7½ to 7 17½	1.58 to 1.69
Beams	7 2½ to 7 12½	1.53 to 1.63
Round bars, ¾ to 3 in.	7 10 to 8 0	1.62 to 1.69
Steel hoops	9 0 to 10 0	1.92 to 2.14
Black sheets, 24 gage	10 0	2.14
Galv. sheets, 24 gage	13 10 to 13 15	2.93 to 2.98
Cold rolled steel strip, 20 gage, nom.	16 0	3.42

*Ex-ship, Tees, nominal.

Continental Prices All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron (a):		
Belgium	£3 3s. to £3 5s.	$15.31 to $15.80
France	3 3 to 3 5	15.31 to 15.80
Luxemburg	3 3 to 3 5	15.31 to 15.80
Basic pig iron (nom.):		
Belgium	3 3	15.31
France	3 3	15.31
Luxemburg	3 3	15.31
Coke	0 18	4.37
Billets:		
Belgium	5 1	24.54
France	5 1	24.54
Merchant bars:		C. per Lb.
Belgium	6 2½	1.35
France	6 2½	1.35
Luxemburg	6 2½	1.35
Joists (beams):		
Belgium	5 3	1.13
France	5 3	1.13
Luxemburg	5 3	1.13
Angles:		
Belgium	6 0	1.30
¼-in. plate:		
Belgium (a)	6 14	1.48
Germany (a)	6 14	1.48
⅜-in. ship plate:		
Belgium	6 9	1.42
Luxemburg	6 9	1.42
Sheets, heavy:		
Belgium	6 1	1.33
Germany	6 1	1.33

(a) Nominal.

rate of 1.12 m. to 2.03 m. (27c. to 48c.) for an 8-hr. day, to which is added 25 per cent an hour for overtime work. If the employee is married and has children the wage is increased by 30 to 80 m. ($7.15 to $19.06) per month.

The average wage paid by the United Steel Works in September to all workmen in the blast furnace and steel works departments, including foremen, apprentices, transport workers, skilled and unskilled labor, was 231 m. ($55.02) per month. The average wage to skilled workmen, excluding foremen, was in the same month 295 m. ($70.27). As a result of bonus payments for overtime, the unskilled workman actually receives 23.3 per cent more than his wage rate shows and the skilled worker receives 27.3 per cent more. From September, 1927, to September, 1928, wages to steel mill workers have advanced an average of 17.8 per cent.

The United Steel Works has expanded its interests recently by absorbing the shares of a large plate and strip steel mill at Charlottenhütte and the Siegener Eisenindustrie. These acquisitions increase the annual capacity of the corporation 350,000 to 400,000 tons. The statement of the United Steel Works for the third quarter shows 172,595 employees, compared with 177,090 in the second quarter of this year, and 15,394 clerical and technical workers compared with 15,530 in the second quarter. Domestic sales amounted to 231,700,000 m. ($55,190,940), compared with 215,600,000 m. ($51,355,920) in the second quarter, and export sales totaled 136,800,000 m. ($31,585,760), compared with 124,600,000 m. ($29,679,720). Pig iron output in the quarter was 1,547,987 metric tons, compared with 1,541,871 tons, and semi-finished output was 1,652,311 tons, compared with 1,619,150 tons. During the quarter four Siemens-Martin furnaces ceased operation, two of which were scrapped.

French Domestic Trade Heavy

Building Expected to Continue Through Winter—German Export Competition Expected to Increase

PARIS, FRANCE, Oct. 10.—Exports of iron and steel are being maintained at a high level, but at present export prices there is a growing possibility of keen competition from the United States and Great Britain, except in certain materials, such as sheets, the prices of which have lagged slightly behind those of other steel products. Another factor that is expected to contribute to a decline in exports is the growing need of German mills for tonnage, which has caused curtailment of their activity in some cases.

In the French domestic market, demand continues large and all branches of the iron and steel industry are well engaged, output being limited only by shortage of labor. Some of the mills rolling heavy material have not put all mills into operation because of the shortage of skilled and semi-skilled workmen. New export business is being sought, especially in the French colonies, and considerable tonnage may be booked for large public works in Indo-China. The present domestic building program is extensive, and in the Paris area the usual winter decline in construction work is not expected.

The domestic market is firm, but further advances in prices are not expected, as producers, in most cases, are opposed to a higher price level, believing that it would lead to demands for wage increases and higher coal quotations.

Pig Iron.—Heavier demand from foundry consumers has brought about an increase in the tonnage available for October from 36,000 tons to 42,000 tons. On this additional 6000 tons, furnaces have agreed to quote an advance of 10 fr. (39c.) per ton, or 450 fr. ($17.55) per ton, f.o.b. Longwy, which will be the market for November and December delivery.

Semi-Finished Material. — Export prices are strong, but show some variation, depending upon the tonnage on the books of the mill seeking business. Blooms are at £4 8s. ($21.38) per ton, compared with £4 10s. ($21.87) per ton early in September, billets £4 10s. ($21.87), compared with £4 15s. ($23.07) about a month ago, and sheet bars £5 ($24.30), compared with £4 10s. ($21.87) a month ago. Most mills are well filled with orders, and rolling mills in the North, which buy semi-finished steel in the open market, are experiencing considerable difficulty in securing sufficient for their requirements. In some instances only about half their total needs has been shipped, and importation from Belgium is being considered.

Finished Material.—Domestic buying is heavy, and, with building construction continuing at a high rate, merchants' stocks of structural material and bars have been depleted and many buyers are seeking to replenish their stocks promptly, foreseeing a large demand from the building trade through the winter months. Deliveries being offered, except to a few preferred customers, range from two to six months. Export demand continues fair, but bars are quoted at £6 7s. per ton (1.40c. per lb.), f.o.b. Antwerp, compared with £6 12, per ton (1.45c. per lb.) about a month ago. Beams show a slight advance at £6 2s. 6d. per ton (1.35c. per lb.), compared with £6 per ton (1.34c. per lb.) early in September. Wire rods also have advanced from £6 12s. per ton (1.45c. per lb.) in September to the present market of £6 16s. per ton (1.49c. per lb.), f.o.b. Antwerp. At a recent meeting of the foremost producers of hoops and strip steel in France, Germany, Belgium and Luxemburg, it was agreed to establish uniform selling methods and extras. A committee was selected to examine the various suggestions made, to ascertain that they did not conflict with the present agreement governing exports of tubes and strips.

Sheets. — Formation of a sheet comptoir is again under discussion, and announcement of its organization is expected soon. The sheet market is lagging considerably behind other products, with prices unchanged but generally easy on heavy and medium gages. The lighter gages continue fairly firm, with demand improved.

Belgian Steel Prices Lower

Mills Granting Concessions and Quoting Earlier Delivery—Pig Iron Weak Despite High Price of Scrap

ANTWERP, BELGIUM, Oct. 13.—Business in the domestic market is smaller and prices are beginning to decline slightly from the recent peak. Mills, however, are still in a strong position with plenty of tonnage on their books, and the concessions that have been granted by some mills on certain sizes of finished steel are not regarded seriously. Producers have suddenly begun to offer December-January delivery, which buyers claim is proof that the long delays in shipments, previously reported, were exaggerated. A contributing factor to the decline of activity in Belgium is probably the corresponding reduction of demand in the French market, where mills for the past fortnight or more have exhibited increasing willingness to grant concessions.

Pig Iron.—Prices show a tendency toward weakness and No. 3 phosphoric foundry iron is quoted at £6 1s. 6d. to £6 2s. 6d. ($29.52 to $29.76) per ton. f.o.b. Antwerp. The market on iron and steel scrap, however, is still high, with No. 1 cast for foundries at 128 Belgas ($17.79) and No. 2 cast at 118 Belgas ($16.40) per ton.

Semi-Finished Material. — Despite slight softness evident in finished steel and some weakness in the pig iron market, semi-finished material is strong, prices showing a continued upward trend. Only a few transactions are reported, but this is largely because of lack of interest in further

tonnage on the part of makers. Blooms of Thomas grade range from £4 9s. ($21.63) per ton for 8-in. to £4 16s. ($23.33) per ton for 4-in. Billets are quoted at £4 19s. ($24.06) per ton for 3-in. to £5 1s. ($24.54) per ton for 2-in., all f.o.b. Antwerp.

Finished Material. — Buyers are pressing for lower prices, and concessions from the recent peak of the market are not unusual. French and Luxemburg mills show themselves quite willing to accept plenty of tonnage, even at the lower prices beginning to prevail. Steel bar prices are easier, except in the small sizes, on which certain producers continue out of the market. Quotations have declined to as low as £6 2s. 6d. per ton (1.35c. per lb.), but the average range of the market is from £6 3s. 6d. to £6 4s. per ton (1.36c. to 1.37c. per lb.), f.o.b. Antwerp. Structural rounds are stronger at £6 2s. 6d. per ton (1.35c. per lb.), and beams are quoted at £5 2s. 6d. per ton (1.13c. per lb.). Demand for steel hoops is light and prices are weaker, with the market at about £6 5s. per ton (1.38c. per lb.), f.o.b. Antwerp.

Steel Imports Are Small

Sellers Here Offer Distress Lots at Low Prices—American Export Rail Prices High

NEW YORK, Oct. 30. — Interest among American consumers in foreign steel is limited. This lack of demand has resulted, in recent weeks, in sales of imported structural material at low prices, despite a continually advancing market in Europe. In the past week, Continental mills have begun to show willingness to quote slightly lower prices, the export market having declined about 5c. per 100 lb. Structural shapes are quotable today at about 1.75c. per lb., delivered New York. Bars are still quoted by European mills at from 1.95c. to 2c. per lb., delivered.

Export business continues small. Chinese merchants are buying small lots of wire shorts, both plain and galvanized, and some tin plate waste waste. Recent business with Japan has been largely in rails. Yokohama municipality has awarded several hundred tons of grooved and guard rails to an American mill, and the Imperial Government Railways is taking bids on 300,000 tie plates, about 1000 tons. On several recent quotations to Japan on rails, the price of American mills has not been sufficiently low to obtain the business. On a tonnage of 16-lb. and 20-lb. sections the American bid was $42.50 per ton, c.i.f. Japanese port, while the Continental quotation was £6 8s. ($31.10) per ton, c.i.f. An inquiry for 50-lb. rails brought out a quotation from the United States of $36.50 per ton, c.i.f., but it was not low enough to secure the order.

Ore to Be Mined in North Sweden

New Company to Operate in Pitea District—Pig Iron Producers Seek Tariff Protection

STOCKHOLM, SWEDEN, Oct. 13.—A new corporation with a capital of 1,000,000 kr. ($267,720) has been organized to engage in mining iron ore in the Pitea district, province of Norbotten, northern Sweden. In addition to mining, the company intends to produce iron and steel. It is understood that the ore in the Pitea district is equal in quality to the deposits in Lapland, both being near the seacoast and convenient for transportation.

The controversy over tariff protection for pig iron played an important part in the recent elections. Producers demanded better protection against low-priced iron from other European countries, and B. G. Prytz, president A. B. Svenska Kullager Fabriken, Gothenburg, argued that Sweden is not in a position profitably to produce iron on a sufficiently large scale for its requirements, as there is a decided shortage of coal. Producers seeking protection pointed to low foreign wages, arguing that Continental prices were largely dictated by the Belgian market, where wages are about 50 per cent less than in Sweden.

The pig iron market has recently begun to show improvement, partly because of firmness in the European market and partly as a result of a decline in production and an exhaustion of stocks during the prolonged strike at the iron mines. Pig iron output in the first eight months of this year was only 237,300 tons, compared with 275,800 tons in the same period of 1927. Steel output, however, increased, 371,000 tons of ingots having been produced in the first eight months compared with 330,000 tons in the first eight months of last year. The output of rolled products was 268,000 tons, compared with 216,000 tons in corresponding period in 1927.

Exports of iron ore, which reached a minimum in May, have recovered, with mines again in operation. Shipments for the first eight months of the year, however, were only 1,979,496 metric tons, compared with 6,856,468 tons in the same period of last year and 4,612,453 tons in the first eight months of 1926.

Prepare for Engineering Congress in Japan

More than 200 engineers and scientists, it is expected, from New York, Chicago, Boston, Philadelphia and other section of the United States will be numbered among the guests at a royal garden party to be held on the grounds of one of the Imperial Palaces of Japan and at a banquet tendered by the Prime Minister of Japan, in connection with the first World Engineering Congress which will be held in Tokio next year.

Dr. Elmer A. Sperry, chairman of the American committee of the congress, has announced that the delegation will be given an opportunity to observe the engineering and industrial projects of Japan and will be taken on excursions which will cover practically all of the historic, scenic, and other points of interest in that country. Committees throughout the United States are arranging for the American attendance and for the papers to be delivered by American engineers.

Maurice Holland, 29 West Thirty-ninth Street, New York, is executive secretary of the American committee. The members of the committee include Edward Dean Adams, H. Foster Bain, W. L. Batt, J. Vipond Davies, E. DeGoyler, Gano Dunn, Bancroft Gherardi, George Gibbs, E. M. Herr, Charles H. Herty, F. B. Jewett, F. R. Low, James H. McGraw, Charles A. McAllister, Ralph Modjeski, William H. Nichols, L. A. Osborne, John V. W. Reynders, Calvin W. Rice, Charles M. Schwab, Alfred P. Sloan, Jr., Elmer A. Sperry, John F. Stevens, Gerard Swope, Calvert Townley, H. H. Westinghouse and William E. Wickenden, New York; W. W. Atterbury and Samuel M. Vauclain, Philadelphia; Howard E. Coffin, J. H. Hunt, W. B. Mayo and C. F. Kettering, Detroit; William Green, Rear Admiral John Halligan, John Hays Hammond, O. C. Merrill, and George Otis Smith and Major-Gen. Edgar Jadwin, Washington; D. C. Jackson, A. E. Kennelly, Arthur D. Little, and S. W. Stratton, Cambridge, Mass.; William Butterworth, Moline, Ill.; C. C. Chesney and E. Wilbur Rice, Jr., Schenectady, N. Y.; W. F. Durand and Charles D. Marx, Stanford University, Cal.; John R. Freeman, Providence, R. I.; Samuel Insull, Chicago; Dexter S. Kimball, Ithaca, N. Y.; Robert A. Millikan, Pasadena, Cal.; Thomas A. Edison, Orange, N. J.; C. F. Scott, New Haven, Conn.; Ambrose Swasey, Cleveland; Elihu Thompson, West Lynn, Mass.; Daniel Willard, Baltimore, and Orville Wright, Dayton, Ohio. Herbert Hoover is honorary chairman of the American committee.

The super airship Graf Zeppelin on its first air voyage over the Atlantic brought to America 2200 invitations to prominent business men throughout the United States to attend the Leipzig Trade Fair in March, 1929.

Public Indifference Injures Railroads

Manufacturers Stress Importance of Railroad Prosperity to General Business—Assail Anti-Trust and Tariff Laws

EMPHASIZING the importance of transportation in developing stabilization in industry, S. P. Bush, American Rolling Mill Co., Middletown, Ohio, struck the keynote at a session of the annual convention of the National Association of Manufacturers devoted to the relationship of railroad transportation to the economic welfare of the country. The association held a convention Oct. 22 to 24 at the Waldorf-Astoria, New York. In presenting the report of the association's transportation committee, of which he is chairman, Mr. Bush pointed out that the rapid development of airplane and motor truck service in recent years has complicated transportation problems, though at the same time it has made transportation potentially a greater force in bringing about industrial stabilization.

He stated that the committee recognizes the need for greater and more intimate coordination of rail and motor transportation, particularly at congested terminals. It also favors the proposal now under consideration whereby the railroads of the country will take over and manage the railroad express business.

The low rate of return on investment realized by the railroads and the indifference on the part of the public to their condition was discussed by Samuel O. Dunn, editor *Railway Age*, New York. He pointed out that the railroads earned only 4.3 per cent on their investment last year and that similarly poor earnings had been realized since 1922. At the same time, he added, the carriers have improved their service immeasurably and this has made possible a reduction of inventories in many industries, thus releasing a large amount of capital for other uses. He referred, as did Mr. Bush, to the recapture clause of the Transportation Act, which provides that the excess of net earnings of any railroad, above 5¾ per cent, must be divided with the Government. It was brought out that the average return of the railroads since 1922 has been only 4.66 per cent, and that while certain roads may have exceeded the Government's figure in a single year, over a period of years they have not. On account of this condition it was suggested that the basis governing recapture should be five years instead of one, so that poorer earnings in one year can be compensated by better earnings in another.

The Jones Bill, now before Congress, which proposes to create a reserve fund of $150,000,000 for Federal works in times of general depression, was referred to by Frank W. Noxon, secretary Railway Business Association, as an important factor looking to the stabilization of railroad earnings. "When construction sags," said Mr. Noxon, "down goes railroad traffic. When work on plants of all sorts slows down the depression ramifies throughout all occupations, curtailing freight and passenger traffic and cutting down railroad earnings. A reserve fund, when called out, would furnish immediate employment to thousands of workers and would also bring demand for material from at least 27 different industries. This stimulus would radiate to many other industries and the nature of the public works program would affect every community."

Railroad Purchases Are Business Indicator

Speaking on the relation of railroad expenditures to general business activity, E. B. Leigh, president Chicago Railway Equipment Co., Chicago, stated that many persons not identified with the railroad supply industry show an interest in the welfare of the railroads because when the roads are making normal expenditures upon their properties general business is good. "Three questions," said Mr. Leigh, "seem in order as to the period in which we now are. First, are railroad outlays sub-normal; second, is there any extraordinary factor capable of sustaining general business during a term of sub-normal railroad expenditure, and, third, has general business been, or is it now being, sustained at a normal rate of growth?"

Mr. Leigh pointed out that railroad expenditures have been sub-normal to the extent that the roads, over a five-year period, have been purchasing only enough materials and equipment to hold inventories at a new minimum. As examples of extraordinary factors which have been sustaining general business during a time of sub-normal railroad buying, the speaker mentioned the development of the automotive industry and the phenomenally high rate of building construction. "For many years," he said, "it was common to say that the railroads consumed from 40 to 50 per cent of the total steel output. From 1920 to 1927, this ratio averaged barely 25 per cent." In answer to the third question as to whether or not business has been sustained at a normal rate of growth, Mr. Leigh pointed out that the rate of increase in railroad ton miles during the last ten years has not by a wide margin been sustained at the pace set after the depressed years of 1893 and 1907.

Commenting on the future prospects, Mr. Leigh said: "In due course the railroads will have taken up all the slack they can in inventory and in efficient use of facilities. Volume of traffic will have developed through the natural growth of population and higher standards of living among consumers. Expenditures on railroad property will average relatively greater than at present. It is perhaps too soon to affirm the doctrine, 'expenditures on railroad property measure volume of general business,' but this factor in our national economy is bound to be at all times so gigantic that it is timely now and always will be to urge a continuance of watchfulness and activity to the end that the financial strength of the railroad shall not be undermined by unsound policy."

Anti-Trust Laws Provoke Competition

Declaring the Sherman Anti-Trust Law is harmful to American industry and that, while intended to prevent the creation of holding corporations which might obtain a monopoly of production, it has actually encouraged corporate mergers, Robert J. Adams, treasurer Adams Mfg. Co., New York, maintained that business needs an affirmative law in its place. The Sherman law, he said, as presently interpreted, operates to produce the exact opposite of what it was designed to do; that is, it stifles competition by making it difficult for the small producers to continue in business. The horizontal consolidations of units seem to be lawful. As a consequence several of our industries have dominant factors which produce commodities formerly competitive and fix the price thereon, while the uncombined competitors of these combinations, working as individual units, are denied by the Sherman law the right to agree on prices even though the agreed prices are not unreasonable.

"All competent authorities," Mr. Adams continued, "are agreed that the anti-trust laws are antiquated, inept and burdensome. The law assumes an honorable business man is a criminal if he uses extra precaution to earn a profit on his investment. It assumes that any agreement is illegal until proved by the perpetrators to be otherwise. That condition makes it expensive, if not almost impossible, to do business successfully."

In solving the problem, the speaker stated that an agency should be created which would be competent to

gather the necessary information to form the basis of a new law. "If the Bureau of Census or any other bureau of the Department of Commerce were given the power to collect all essential statistics on industry and commerce, we might have an excellent fact compendium to begin with. The work would be enough, in fact, to keep an entirely new bureau engaged. It would at least provide a central agency with sufficient authority to gather all the necessary statistics and other data essential to a proper understanding of the day by day development of our business life.

"We are in need of an affirmative statute, one that is calculated to aid and protect industry rather than a law like that under which we are now supposed to operate. The original idea in creating the Federal Trade Commission was to give us just that body we now feel such a need of. It was supposed to advise business men and to assist in putting a stop to unreasonable methods of competition. Price fixing would tend to stagnate business and curtail legitimate competition. It might deprive the consuming public of the right to benefit from manufacturing progress. It would be best to avoid any semblance of price fixing, but that should not prevent us from endeavoring to prevent price cutting."

George M. Verity, president American Rolling Mill Co., Middletown, Ohio, advocated a reinterpretation of the anti-trust laws. In his opinion the need of restricting free operation of business has disappeared and a reverse situation has now developed. "Greater stabilization and uniformity of operation and control of both production and distribution," he said, "so that savings made may not be dissipated in unnecessary and uneconomic competition, is the great need of industry today."

Urge Federal Tariff Board

Stressing the importance of the tariff in preserving American standards of living, William W. Nichols, Allis-Chalmers Mfg. Co., Milwaukee, and chairman of the association's committee on tariff, reiterated suggestions of the association's board of directors that a non-partisan, semi-judicial board, appointed by the President, be set up in place of the present Tariff Commission. Such a board, he stated, should "be capable of basing its findings on sound and all-inclusive economic considerations.

"Unfortunately," he said, "a fundamental weakness so impairs the usefulness of the present commission as to make its continuance a grave question in the minds of some people. Its bi-partisan character suggests a Congressional sincerity in meeting the issues. This bi-partisan division has blocked progress for years. Such tariff increases and the few decreases that have been made to date by the commission have been so trivial in comparison with needs as to hold up for ridicule the whole performance of one of the most important Government institutions."

Suggesting methods by which the National Association of Manufacturers might contribute to tariff reform, Joseph W. Randall, J. Randall & Brothers, Philadelphia, advised the indorsement of a protective tariff free from discrimination or special privilege. He approved the plan of allowing each industry to appoint its own representatives to make recommendations to Congress and to the President regarding its tariff needs without definite or implied support of such schedule by any association representing a variety of trades and industries, leaving Congress and the President to decide whether the schedules so recommended meet the requirements of a tax on imports.

Conditions in Different Industries

Foundries Report Business Not Quite So Favorable—Outlook Excellent in Machinery Field

ANALYSIS by industries of the business survey made by the National Association of Manufacturers, a general review of which appeared in THE IRON AGE last week, indicates excellent conditions in the iron and steel industry, some improvement in the foundry business and excellent prospects in the machinery trade.

Iron and Steel Industry Thriving

In the iron and steel industry excellent business is reported by 21 per cent of the companies replying to the questionnaire, good conditions by 43 per cent, fair by 31 per cent, with 5 per cent pronouncing it poor. Twelve per cent of the replies expect an excellent winter business, 51 per cent good, 30 per cent fair, and 7 per cent poor. Compared with last fall, business is pronounced better by 50 per cent, not so good by 36 per cent, and unchanged by 14 per cent. Inventories are regarded low by 15 per cent; normal, by 80 per cent; and overstocked, by 5 per cent. A large increase over last fall in employment is noted by 11 per cent, with 57 per cent noting a small increase, and 32 per cent noting a small decrease. A dearth of skilled workers is reported by 13 per cent, but the supply of unskilled workers is adequate. Small increases in wages since last fall are reported by 76 per cent, and a small decrease by 24 per cent. Increased production over last fall is reported by 73 per cent, greater sales quantities by 70 per cent, and higher sales values by 60 per cent. The industry is reported 97 per cent free of strikes.

Foundries Lag Slightly

In iron foundries and machine shops trade conditions are pronounced excellent by 8 per cent, good by 40 per cent, fair by 36 per cent, and poor by 16 per cent, with the outlook for winter regarded as excellent by 7 per cent, good by 31 per cent, fair by 49 per cent, and poor by 13 per cent. Last fall's business in the experience of 36 per cent of those reporting is exceeded, with 38 per cent reporting a falling off over last year, and 26 reporting it unchanged. Low stocks on hand are reported by 12 per cent, normal by 74 per cent, and an over supply by 14 per cent. A large increase in employment since last fall is reported by 17 per cent, a small gain by 40 per cent, a large decrease by 5 per cent and a small decrease by 38 per cent. A shortage of skilled workers is reported by 28 per cent, and of unskilled labor by 2 per cent, while large increases in wages over last fall are reported by 10 per cent, small increase by 70 per cent, large decrease by 4 per cent, and a small decrease by 16 per cent. Greater production than at this time last year is reported by 64 per cent, large sales quantities by 50 per cent and higher sales values by 30 per cent. No strikes are reported in the industry.

In the machinery industry excellent business is reported by 25 per cent, good by 28 per cent, fair by 36 per cent, and poor by 19 per cent, while 14 per cent regard the outlook for winter as excellent, 46 per cent as good, 36 per cent as fair, and 4 per cent poor. Compared with last fall, business at present is pronounced better by 49 per cent, not so good by 27 per cent, and unchanged by 24 per cent. Low inventories are reported by 19 per cent, normal by 70 per cent, and overstocked by 11 per cent. A large increase in employment since last fall is reported by 14 per cent, a small increase by 56 per cent, a large decrease by 2 per cent and a small decrease by 28 per cent. Thirty per cent report a shortage of skilled labor, and 2 per cent an inadequate supply of unskilled workers. Production is higher than last year, according to 68 per cent; sales quantities greater, 65 per cent; and sales values higher, 64 per cent.

For number of long-time employees, the Jeffrey Mfg. Co., Columbus, Ohio, maker of conveying and crushing machinery, believes it stands in almost a unique position. The employees have a 20-year service club in which there are 292 active members. At the annual picnic in September, 32 new members were added to the roster. The president of the 20-year service club, O. R. Ehret, has a service record of 49 years.

Refractories Men Discuss Specifications

Methods of Making Tests Considered at Fall Meeting—Proposal to Avoid Duplication of Effort

ABOUT 70 men interested in refractories and their use gathered in the Hotel Vanderbilt, New York, Oct. 24, to discuss problems germane to their work. This was the fall meeting of the American Refractories Institute. Mainly, the meeting was given over to a discussion of specifications for fire-brick for various purposes, and to a consideration of test methods whereby specifications could be checked. Standard load tests, spalling tests, and size requirements formed the subjects of separate papers.

In the morning session there was discussion of a proposal to join hands with the American Ceramic Society in so far as work of the two organizations overlaps, and thus by mutual effort avoid duplication of work. This proposal was received with approval by the members present but must have ratification from the board of directors.

Tests Under Load, Hot

Load tests on brick formed the subject of a paper by C. E. Bales of the Ironton Fire Brick Co., Ironton, Ohio. He showed slides depicting a standard form of furnace for making load tests at high temperatures. About ten brick are handled at once in the furnace, each being subjected to a load of 25 lb. to the sq. in., provided by springs attached to one-half of the grip and adjustable from outside the furnace. Heat is applied at 2462 deg. Fahr. (1350 deg. C.), and surface combustion of gas is used. It is possible to control the atmosphere in the furnace. The test follows the specifications of the American Society for Testing Materials.

While this test is supposed to show the refractoriness of the brick, it does not show how the material will perform in service. Tests of 50 or more types of brick, which were made at the Mellon Institute, Pittsburgh, under the refractories fellowship, showed an average deformation of 5.7 per cent under these tests. Progressive loads were applied; the first test being at 10 lb., then 25, and then 40 lb. to the sq. in., with ascending deformation under the successive increases in load.

Causes of Spalling

Spalling tests were taken up in a paper by Scott McDowell, who referred to the thermal spalling of silica brick, caused by rapid temperature changes. Characteristics of brick were shown on a diagram which gave the expansion ratio of different brick at various temperatures of heating. There is a quick jump in the expansion of silica brick, beginning at 575 deg. Fahr. and running up to 1250 deg. Within this range spalling is bad; above 1250 deg., however, there is no further expansion and rapid changes in temperature above that point no longer induce spalling. In the range of 100 deg., from 575 to 675 deg., the expansion of silica brick jumps from 1/16 in. to each foot of length to ⅛ in. Strains set up from this cause are relieved by cracking, either internally or on the surface, the latter giving rise to spalling.

Because of wide variations in results on individual bricks, the spalling test, involving dipping in water, should always be made on at least five samples, and preferably on ten. If the percentage loss is to mean anything, the number of dips involved at high temperature should be specified. There may be no spalling in the first three or four dips, and then a chunk will come off on the next one.

Machine for Brick Measuring

Size requirements were taken up by Mr. Phelps of the Mellon Institute, with particular reference to a machine that has been developed at the institute for measuring brick between two plane parallel surfaces. The head is so designed that the 4½-in. and the 9-in. dimensions may be measured without changing the position of the measuring element. For the thinner 2½-in. dimension, however, the head is reversed in position, bringing a third plane surface into play. The lower member, which operates in conjunction with any one of the three upper surfaces, is movable, the extent of its motion being indicated by graduations in connection with the handle operating the moving mechanism. This denotes departure either side of the standard length, width or thickness.

The machine is portable, weighing about 60 lb., and is customarily set on a table or bench. It may be used readily by either the manufacturer or the consumer, and can be made at a cost of about $60 each in lots of 25 machines.

Announce Personnel of Sanderson Company

Edward P. Sanderson, Robert H. Sanderson, John J. Nolan, William G. Hepburn, Robert A. O'Donnell, William T. Ryan, Leigh N. Vaughan, George McLean and James F. Welch, former officers and members of the E. P. Sanderson Co., Cambridge, Mass., and John C. Huxley, William Robinson, Lester E. Stevenson, Harold Bellamy, Davis G. Wallace and Curtis M. Blood, former managers and members of the Cutter & Wood supply department of the E. P. Sanderson Co., have organized a new company under the firm name of Cutter, Wood & Sanderson Co., succeeding to the mill supply, heavy hardware, horseshoeing supply and automobile trimming departments of the E. P. Sanderson Co., not sold or transferred with the recent sale of the steel departments to the Joseph T. Ryerson & Son, Inc. The new company will occupy quarters at 222 to 232 Third Street, Cambridge, Mass.

Cleveland Selected for Trial Industrial Census

WASHINGTON, Oct. 30.—The Department of Commerce has arranged to make a trial census of industrial purchases; that is, purchases by manufacturers of raw and semi-finished materials, supplies and equipment. A census of these primary stages of distribution was felt necessary to supplement the census of wholesale and retail distribution made some time ago in 11 cities. The object of each of these censuses is to provide an idea of valuable information to be sought and how to prepare schedules to obtain such information in a national census of distribution such as is provided for in the authorization bill for the fifteenth decennial census (1930) pending approval of the Senate.

While many cities could have qualified for the industrial purchase census, Cleveland was decided upon because of the cooperation offered by the Cleveland Chamber of Commerce, as well as the evident suitability of the city's manufacturing situation. Cleveland had in 1925, according to the census of manufactures for that year, 2212 factories, among which 91 different classifications of industry were doing at least $100,000 business annually. The total value of products was $1,094,000,000. Among the leading industries are iron and steel, motor vehicles, foundry and machine shops, electrical machinery and apparatus, slaughtering and meat packing, paints and varnishes, stoves and appliances, clothing, bread and bakery products.

Makes Loans for Further Shipbuilding

WASHINGTON, Oct. 30.—The Shipping Board has issued a statement that it would be another year before the full effect of the Jones-White act on American shipping can be entirely appraised. Its stimulation, however, is cited to show present conditions. Two loans from the construction fund have actually been concluded, those of the American Line Steamship Corporation, in aid of the construction of the Virginia and a sister ship as yet unnamed, and four loans have been authorized for the Export Steamship Corporation, which proposes to build four combination passenger and cargo vessels. Construction has been started on the two American line ships and bids for the construction of the four Export ships will be opened Nov. 5. Three loans, involving the construction of seven ships, are now being negotiated.

Gray Iron Institute to Meet Nov. 14

The Gray Iron Institute, Terminal Tower Building, Cleveland, will hold its first annual meeting Nov. 14 at the Cleveland Chamber of Commerce rooms in the same building. Reports of officers will be received, directors elected for the ensuing year and matters of policy determined.

The institute has shown a healthy growth since it was organized in Philadelphia, May 18. At that meeting directors were chosen for a six months' period, the incorporation of the institute was authorized and other steps were taken to place it on a well established business basis. Since that time considerable progress has been made. A good many new members have been added and the organization now comprises 70 gray iron foundry companies in various sections of the country.

The board of directors has appointed the following as members of a committee on nominations for directors: Chairman Howard J. O'Neil, Western Foundry Co., Chicago; Paul C. DeWolf, Brown & Sharpe Mfg. Co., Providence, R. I.; David L. Sacks, Louis Sacks Foundry, Inc., Newark, N. J.; Harry Cooke, Olney Foundry Co., Philadelphia; William F. Bornfleth, Cream City Foundry Co., Milwaukee.

Davison Development of Neville Island

Davison Coke & Iron Co., Pittsburgh, is moving ahead steadily with its construction program at Neville Island, which includes a cement plant, a battery of by-product coke ovens, a new power plant, betterments to the Neville furnace acquired from the American Steel & Wire Co., and the building of a dock for handling river borne freight. The dock will be built by the Dravo Contracting Co., Pittsburgh. Building foundations will be built by the Rust Engineering Co., Pittsburgh. The Allis-Chalmers Mfg. Co., Milwaukee, has the contract for the cement mill machinery and two De Laval turbo blowers for the blast furnace will be furnished by the Dravo-Doyle Co., Pittsburgh.

Engineers to Discuss New Methods of Shipment

On Dec. 6, at a special session of the American Society of Mechanical Engineers, New York, six papers will be read treating from different angles the problem of shipping materials on skid platforms. Mechanical methods of handling, common in plants throughout the country, have recently entered the distribution field and the Department of Commerce has sponsored a movement to standardize equipment and provide interchangeability in use.

The keynote paper will be delivered by R. L. Lockwood of the department, who will trace the development of shipping material on skid platforms, outline the possibilities for growth and explain the importance of interchangeability in the equipment. Other speakers will be J. V. Miller, assistant general storekeeper Chicago, Milwaukee, St. Paul & Pacific Railroad, "Application of Skid Shipment to the Stores Department of a Large Railroad and the Economies Obtained"; George B. Wright, freight traffic manager Detroit & Cleveland Navigation Co., "Material Handling by an Inland Waterway Transportation Company"; C. B. Crockett, industrial truck department Society for Electrical Development, New York, "Economic Aspects of Skid Shipment from the Standpoint of the User"; F. J. Shepard, Jr., treasurer Lewis-Shepard Co., Boston, "The Part Played by the Manufacturer of Trucks and Skids in the Adoption of Interchangeable Equipment"; F. E. Stocker, resident manager McCormick Steamship Co., "Application of Skid Shipment in the Field of Ocean Transportation."

New Gas for Protection Against Fire

The American-LaFrance & Foamite Corporation, Binghamton, N. Y., through its industrial fire equipment division, has placed on the market a system of carbon dioxide protection against fire known as the Alfite system. It employs an inert gas known as Alfite confined in a liquid state in metal cylinders 51 in. in height and 8½ in. in diameter under a pressure of 900 to 1000 lb. When the system is placed in operation a plunger ruptures a copper disk used to seal the gas in the cylinder and permits the gas to pass through piping to nozzles located at the fire. Here the gas is liberated into the room or space being protected, where it expands and dilutes the air, thus to smother the flame. The system may be operated manually, semi-automatically or automatically, and a variety of operating devices are available.

Trade Extension Flight to South America

To improve trade relations with the South and Central American countries an American-made tri-motored monoplane will make a non-stop flight from North America to South America, and will then tour the principal Latin-American countries. In each of the trade centers visited an industrial moving picture will be shown, describing the American cities supporting the flight and a group of representative industries that are seeking Latin-American trade. In addition, a booklet on American products, printed in the languages of the countries visited, will be distributed.

The organization behind the undertaking is the South American Trade Extension flight. Hugh Morrow, president Sloss-Sheffield Steel & Iron Co., Birmingham; Gen. William L. Seibert, chairman Alabama State Docks Commission and the Boulder Dam Commission, and S. C. King, vice-president of the Bank of Ensley, Ensley, Ala., are initial members of an advisory board now being selected. Lieut. Donald C. Beatty of the 106th Aero Squadron is chief pilot and director of the flight. The Bank of Ensley is acting as trustee for the organization and S. C. King is trust officer.

Program of Institute of Steel Construction

The program of the sixth annual convention of the American Institute of Steel Construction, to be held at Biloxi, Miss., Nov. 13 to 17, includes the following papers:

"Steel and Its Markets," by C. H. MacDonald, Colorado Fuel & Iron Co.

"Structural Steel in the Federal Building Programs," by J. Edward Cassidy, consulting engineer, Washington.

"Welding as Applied to Structural Steel," by Fred T. Llewellyn, president American Welding Society.

"Flame Cutting of Structural Steel," by E. A. Doyle, consulting engineer Union Carbide & Carbon Corporation, New York.

"The Buyer's Attitude on Competitive Selling," by L. F. Boffey, editor *Purchasing Agent*.

"Character in Salesmanship," by C. K. Woodbridge, president Kelvinator Corporation, Detroit.

"Fire Protection," by Clinton T. Bissell, associate consulting engineer National Board of Fire Underwriters.

"Steel Joists in Buildings," by Frank Burton, consulting engineer, Detroit.

"Art in Bridge Design," by Dr. J. Horace McFarland, chairman Pennsylvania State Art Commission.

British Steel Imports and Exports Both Decline

WASHINGTON, Oct. 29.—Imports of iron and steel products into Great Britain in September aggregated 184,464 gross tons, a decrease of 32.2 per cent under imports of 272,368 tons in August, while exports from Great Britain in September amounted to 295,123 tons, a decline of 20.2 per cent under outgoing shipments of 369,779 tons in the preceding month, according to a radiogram received by the Iron and Steel Division, Department of Commerce, from Commercial Attaché William L. Cooper, London.

The sharp decrease in September imports was due to a drop in almost all lines. The only gains were in 2904 tons in "all other manufactures" and 2845 tons in pig iron, together with an inconsequential increase in cast tubes. The greatest drop was in ingots and blooms, which fell off 46,576 tons, or from 114,472 tons to 67,896 tons.

Of the drop of 74,635 tons in exports, the greatest declines were in tin plate, 17,898 tons; galvanized sheets, 15,430 tons; plates and sheets, 15,076 tons, wrought tubes, 7753 tons, and steel bars, 2654 tons. The only gain of consequence was in pig iron, 3364 tons.

Discuss Blast Furnace Problems

Eastern States Association Finds Advantage in Using Open-Hearth Slag—Touches on Bell Diameters

PITTSBURGH, Oct. 27.—Attendance at the fall meeting of the Eastern States Blast Furnace and Coke Oven Association at the Shannopin Country Club, Ben Avon, Pa., Friday, Oct. 26, suffered from the fact that the fall meeting of the American Iron and Steel Institute was being held the same day in New York. Smaller representation than usual at the blast furnace and coke oven meeting failed to affect the interest, which ran high in such matters as the efficiency and the quality of the iron produced in large modern steel works blast furnaces as compared with those of smaller dimensions.

The benefits derived from the use of open-hearth slag to replace limestone in the blast furnace were stressed. With slag running as high as 27 per cent in iron, there was not only this addition to yield, but the use of limestone could be cut by 400 to 500 lb. per ton. There was altogether, making allowance for the high manganese content of the slag iron, a possible saving of 50c. per ton in the cost of making pig iron.

Discussion of the distribution of the burden touched strongly on the size of the bell and the stock line, and the need of a definite relationship between the bell and stock line dimensions if there was to be the distribution of charge that would permit penetration of the gas. The trend toward the small bell was held to be correct if it did not result in one too small. A 12-ft. bell and a 17-ft. stock line was said by several speakers to be the proper proportion relationship.

The discussion of the relative merits of coke made from straight high volatile coal and that produced from a mixture of low and high volatile coal veered more favorably to the latter. What the makers of blast furnace refractories are doing to improve their quality was told by the representative of one of the larger manufacturers, who pointed out with an increased use of flint instead of plastic clays the brick might suffer in appearance.

While it was said that credits of close to $2 a ton might be made from blast furnace gas, there was also a suggestion that a study of the costs of the equipment necessary to utilize fully the waste heats might make the investment of doubtful value, since the saving would be burdened with the added financial overhead.

A. E. Maccoun, superintendent of blast furnaces Edgar Thomson works, Carnegie Steel Co., Braddock, as chairman of the round table discussion, ably handled the meeting. B. W. Winship, superintendent of coke plant Bethlehem Steel Co., Steelton, Pa., and president of the association, presided at the evening meeting, at which W. L. Stevenson, chief engineer Pennsylvania State Department of Health, and F. H. Waring, T. E. Dugan, E. S. Tisdale, holding similar positions in the State health departments of Ohio, Kentucky and West Virginia, detailed the successful solution of the problem of phenolic wastes from coke plants in rivers drawn upon for drinking water.

President Winship announced the appointment of O. O. Malleis, chief chemist Koppers Co., Pittsburgh, to succeed John W. Hacker, formerly superintendent of coke plant Central Alloy Steel Corporation, Massillon, Ohio, as chairman of the coke testing committee of the association.

A. M. Byers Co. Plans Large Expansion

Plant and Equipment for Utilization of Aston Process of Making Wrought Iron Will Cost $10,000,000

EXPERIMENTAL work by the A. M. Byers Co. at its Warren, Ohio, plant with the Aston process for making a synthetic iron having the same chemical and physical properties as hand puddled wrought iron has been attended by success sufficient to warrant production of the new material upon an enlarged scale. Accordingly, the Byers company will soon begin work on a new plant to be erected on a site of 112 acres recently acquired at Harmony, Pa., not far from the steel fabricating district which embraces Ambridge and Economy, Pa.

Complete plans for the new plant call for an expenditure of $10,000,000 and include pipe mills, a blast furnace, a by-product coke plant and a river terminal for handling inbound raw materials and river shipments of finished products. The initial units of the new plant, with a monthly capacity of 15,000 tons, will include the cupolas for meltnig cold pig iron, Bessemer converters for refining the molten iron, the thimbles for holding molten slag of puddling characteristics, and rolling mills for bringing the ingot to skelp form. The South Side plant of the company in Pittsburgh, containing one buttwelding and two lapwelding furnaces, capable of making pipe from ¼ in. to 12½ in. diameter is to be utilized for making pipe of the Aston iron. The company plans to spend $1,000,000 in betterments at that plant.

The Byers company and Spang, Chalfant & Co., Inc., are under the same control, and the latter recently absorbed the Standard Seamless Tube Co., with a plant at Economy near where the new Byers plant is to be built. The common control of the two companies is the basis of reports that Aston iron would be used for making seamless pipe, but officials of the Byers company say no arrangement of this sort has been made and that none is contemplated.

Eliminates Hand Puddling Methods

The Aston process is one designed to eliminate the costly hand puddling method of making wrought iron and is a system of independently refining the base metal and then effecting disintegration of this metal and incorporation of the slag to produce wrought iron.

The base metal is refined to a degree conforming to commercially pure iron characteristics in a Bessemer converter. This molten metal is poured from a ladle into a thimble containing molten slag of puddling characteristics. Without application of either manual or mechanical working of the mass, the metal is disintegrated into a sponge, impregnated with molten slag. The resultant ball or sponge is pressed to a rectangular bloom, and rolled to billet or bar sections.

In addition to the refining accomplished in the converter, the entry of the metal into the slag is said to secure a high degree of super refining. In addition, the dominant characteristic of wrought iron, namely, the uniform and fine dissemination of slag throughout the product, is effected.

H. A. Brassert & Co., Chicago, who have cooperated with the A. M. Byers Co. at Warren, Ohio, in developing the Aston process for making wrought iron, have been given the contract for the engineering for the new Byers plant. The plant will consist, in addition to the department to make the wrought iron, of a 40-in. blooming mill, a 42-in. universal plate mill, an 18-in. and a 16-in. semi-continuous skelp mill and a 14-in. and a 9-in. skelp mill. When completed it will have an annual capacity of 360,000 tons of skelp and plate.

Martin Aircraft Plant Goes to New Company

Commercial airplanes will be built in Cleveland by the Great Lakes Aircraft Corporation, incorporated to take over the plant now occupied by the Glenn L. Martin Co. The new company will acquire all the present equipment of the Martin plant. The Martin company will move in January to Baltimore, where it will devote its attention exclusively to the manufacture of military aircraft. It is understood that about $2,000,000 was involved in the sale of the Martin plant. William R. Wilson, president Guardian Trust Co., Detroit, and for many years identified with the automotive industry in that city, is chairman of the board of the Great Lakes Aircraft Corporation.

Wholesale Prices Higher in September

Commodity prices in September are reported by the United States Bureau of Labor Statistics at 100.1, on the basis of the 1926 average at 100 for 550 items. This represents a substantial increase from the 98.9 recorded in August and is still further above the 96.5 of September, 1927. Farm products and foods show the heaviest advances of any items during the month. Live stock and poultry in the one group and meats in the other recorded advances of more than seven points in each instance. Fractional advances were made in fuels, metals, building materials, chemicals and the miscellaneous items, while there were fractional recessions in leather and textile products. House furnishing goods showed no change.

Metals and metal products are placed at 100.5, compared with 100.4 a month earlier and with 97.6 a year ago. Iron and steel and non-ferrous metals both advanced slightly, while automobiles showed a fractional recession and agricultural implements and other metal products were unchanged from the preceding month.

Food prices have gone so high, in some items, that the bureau's index of retail prices shows the several grades of beef at the highest level in many years—higher even than in the war period or in the price "bulge" of 1920.

Coke Production at Higher Daily Rate in September

WASHINGTON, Oct. 20.—Total production of by-product coke for the 30 days of September was 3,958,682 net tons, against 3,994,924 tons in the 31 days of August, according to the Bureau of Mines. The daily average rose from 128,869 tons to 131,956. Production of beehive coke in September was 312,000 tons and the daily rate was 12,520 tons, against 10,667 tons in August. Total output of both by-product and beehive coke for September was 4,270,682 tons, compared with 4,282,924 tons in August.

Steel Castings Orders Largest Since May

Aggregating 82,173 tons, or 57 per cent of the monthly capacity of 144,200 tons of the 129 makers reporting to the Department of Commerce, orders for commercial steel castings in September were the largest since May, when new business amounted to 86,414 tons.

Orders in August were 81,452 tons, or 56 per cent of capacity. Production in September totaled 75,199 tons, or 52 per cent of capacity, against 87,320 tons in August.

Orders in September were divided as follows: Railroad specialties, 35,234 tons, or 52 per cent of this class of capacity; miscellaneous castings, 46,939 tons, or 65 per cent of capacity.

Production in September included 25,311 tons of railroad specialties, or 38 per cent of such capacity, and 49,888 tons of miscellaneous castings, or 65 per cent of such capacity.

Total orders for the nine months ended with September were 737,222 tons, against 727,314 tons for the corresponding period of last year. Production for the nine months of this year was 765,773 tons, compared with 784,977 tons for the corresponding period of last year.

Malleable Castings Orders Show Slight Loss

Orders for malleable castings in September totaled 55,278 tons, against 56,415 tons in August, according to reports received by the Department of Commerce from the principal manufacturers. Production was 56,650 tons, or 63.2 per cent of capacity, compared with 61,833 tons, or 68.5 per cent of capacity in August, while shipments were 55,645 tons and 58,914 tons, respectively.

Orders for the nine months of the present year totaled 492,039 tons, against 440,825 tons for the corresponding period of last year. Production was 529,158 tons and 495,902 tons, respectively.

Smaller Output of Steel Boilers Reported

New orders in September covered 1420 steel boilers, with heating surface of 1,251,268 sq. ft. These are the smallest figures in several months, but are above those of September, 1927, which were 1312 units and 1,152,265 sq. ft. The August figures were 1649 boilers and 1,459,652 sq. ft. For the first nine months of the year orders totaled 12,466 units and 11,833,937 sq. ft., compared with 12,387 units and 12,771,356 sq. ft. last year.

Steel Barrel Production Falls Off in September

Production of steel barrels in September is reported by the United States Department of Commerce at 593,255 units, with shipments totaling about the same amount. This represents 50.2 per cent of capacity. There has been a sharp falling off from immediately preceding months, in which new high records were made. The September figure, which is the lowest since February, compares with 677,313 units in August. It is, however, much higher than the 521,899 units of September, 1927.

Unfilled orders at the end of the month were the lowest since Nov. 30, 1927. They called for a total of 996,820 barrels, of which 292,686 were for delivery within 30 days.

Shipments of members of the Steel Barrel Manufacturers' Institute in September numbered 328,597, and unfilled orders at end of month called for 377,922 units. The business of the month is reported at $949,164. Capacity was used to the extent of 48 per cent, representing 24.3 per cent for I.C.C. barrels and 54.5 per cent for light barrels.

River Steel Movement Heavy

The down-river movement of steel from the Pittsburgh district was heavy again in September. The monthly report of the Pittsburgh office of the United States Engineers' Corps shows the Ohio River movement to have been 125,062 net tons, compared with 124,751 tons in the preceding month and 98,809 tons in September last year. For the nine months ended with Sept. 30, Ohio River steel shipments from the Pittsburgh district were 894,306 tons, a monthly average of 99,367 tons. In the same period last year the total was 487,504 tons, an average of 54,169 tons monthly.

Automobile Output Within 2 Per Cent of 9-Month Record

WASHINGTON, Oct. 27.—Production of motor vehicles in the United States in September declined to 413,722 from 461,356 in August, according to the Department of Commerce. Of the September output, 358,872 units were passenger cars and 54,850 were trucks. The August output of passenger cars was 400,593 while the production of trucks was 60,763. The September, 1927, figures were 226,443 passenger cars and 33,944 trucks, a total of 260,387.

Nine-month automobile and truck production this year has far exceeded that for the corresponding period of last year, totaling 3,469,075, against 2,906,672 vehicles, a gain of 19.3 per cent. The output of passenger cars for the nine months in 1928 was 3,064,237, and of trucks, 404,838; comparing with 2,540,312 and 366,360 respectively for last year.

In 1926, the record year, the total production in the first nine months was 3,540,153, or 2 per cent ahead of 1928. This included 3,153,922 passenger cars and 386,231 trucks. In 1925, which had a total production within 1 per cent of that of 1926, and exceeded it in trucks, the nine months showed 2,746,877 passenger cars and 387,447 trucks, a total of 3,134,324.

September production of automobiles in Canada, as reported to the Department by the Dominion Bureau of Statistics, was 16,572 passenger cars and 4621 trucks, compared with 24,274 passenger cars and 6971 trucks in August.

Apparent consumption of babbitt metal in September was the largest for any month since August of last year. Reports received by the Department of Commerce place the total at 5,308,403 lb., compared with 4,755,662 lb. in August and with 4,792,367 lb. in September, 1927. For the first nine months the total was 43,263,987 lb., compared with 46,024,504 lb. last year.

This Issue in Brief

Unreliable cost figures result when manufacturing burden is charged on the basis of direct labor cost, except when plant makes only a single article, of one size, says cost accountant. "There is no relation between operator's compensation and the cost of running the machine." Burden should be charged on the basis of normal operating hours.—Page 1097.

* * *

Costs less to make certain parts of alloy steel than of plain steel. Automobile parts manufacturer uses cold-drawn nickel steel instead of plain carbon steel, which has the necessary strength, because uniformity of the alloy steel gives lowest cost per finished part.—Page 1093.

* * *

Loans can be secured more easily if manufacturer is able to budget or to forecast operations. Confidence on the part of the banker and of the management of the business itself is promoted by ability to forecast or to budget.—Page 1098.

* * *

Stock danger limit is established monthly. Automobile manufacturer calculates parts danger limit monthly, and provides for an average three months' supply.—Page 1081.

* * *

To obtain clean castings, skim gate should be designed to choke the metal where it enters the inlet gates that lead to the mold, and at the same time provide a free escape for all impurities collected at this point.—Page 1082.

* * *

Ford is now using about 15 lb. of malleable castings in Model A cars, and may increase to 40 to 60 lb. Castings replace forgings, due, it is understood, to failure to get forging deliveries.—Page 1107.

Stable and well-sustained volume of business during the winter months is indicated, says Dr. Haney. The outlook is that earnings will be fair to good in a majority of industries.—Page 1105.

* * *

Highest strength castings are usually low in total carbon, with pearlitic or even sorbitic matrix, says metallurgist. General grain size is small, and there is a very fine distribution of graphitic carbon.—Page 1084.

* * *

Fluctuating prices compel steel buyers to speculate on the cost of their raw material, says Charles M. Schwab. Policy of open prices would be of benefit alike to producers and consumers, he declares. Price stabilization is possible without collusion on part of producers.—Page 1086.

* * *

Flaws in steel rails can be accurately located within 1/32 in. of actual place where they exist, by passing an electric current through the rail. If the rail has no defects, recording apparatus will show a straight line. If there are defects, the current is obliged to pass around them, thus immediately recording the location.—Page 1090.

* * *

Fatigue tests on welds are needed. Scattering results of published fatigue tests indicate that none of them can be relied upon, says Bethlehem Steel Co. executive.—Page 1092.

* * *

Rusting of welds is retarded by using coated or covered electrodes, engineer declares. Rust resistance is better than when standard bare wire is used, he says. Recommends study of relative corrosion of weld and base metal, and meanwhile recommends paint to keep corrosion in check.—Page 1092.

Speeds stockroom operations by mounting on conveyor trays cardboard symbols designating the section to which trays are routed. Thus stock clerks can tell from a distance which trays are for their respective sections and be ready to remove their trays without confusion.—Page 1076.

* * *

True volume of business and industry is only moderately large, says Dr. Haney. Railroad freight traffic and wholesale trade are both below what they were a year ago. In comparison, the high rate of speculation seems excessive.—Page 1104.

* * *

Errors in handling stock are reduced by placing similar kinds of parts in *different* sections of stock room. Parts resembling each other in size and form can advantageously be separated, automobile manufacturer finds. Thus each stock man has parts so different that he has no trouble in recognizing parts wanted on requisitions.—Page 1076.

* * *

Heart of parts storeroom is one continuous conveyor serving every department. Chain-type conveyor in automobile parts storeroom follows a devious route, making dips, turns and rises. It carries parts from stock clerks to checkers and stock replenishments to stock clerks.—Page 1076.

* * *

Export trade in steel continues high. September shipments were below August but 39 per cent above last year. Machinery exports declined sharply, September having been 25 per cent below August, and 4 per cent under September, 1927.—Page 1105.

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THE IRON AGE

W. W. MACON
Managing Editor

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In Prosperity Prepare

IN time of prosperity prepare to keep prosperity. This was the gist of the presidential address of Charles M. Schwab before the fall meeting of the American Iron and Steel Institute. He believes that the problems of the post-war period are largely behind us and that industry has the foundation for a prosperity far beyond anything it has yet seen. In so saying he was not merely expressing the native optimism that has carried him far on the road of success, but he supported the statement by one of the most searching and comprehensive analyses of steel trade conditions ever presented to the institute.

A fundamental change to which the address called attention is the retarded growth of steel consumption. Once demand virtually doubled every decade; in the past 15 years it has increased only 55 per cent. Thus the industry can no longer rely on expanding consumption quickly to overtake overexpanded capacity. Warning against the temptation to add new plant under the stimulus of recent prosperity, Mr. Schwab urged a temporary "moratorium" on such construction. Demand, he said, is now more nearly in balance with supply than at any time since the war, and this favorable relation can be quickly upset.

Along with his caution against plant expansion Mr. Schwab made a plea for an open one-price policy in selling steel. On first thought this might seem like overstressing the need of a more stable market, in view of recent improvement in prices. But, as Mr. Schwab pointed out, it is idle to expect to cure indiscriminate price cutting in periods of slack demand merely by preaching economic truths. Obviously the time to initiate reforms in selling is when demand and supply are fairly balanced. And the way to make such reforms stick is by preventing the balance from being disturbed by overbuilding.

A third specific offered by President Schwab is the development of new uses for steel. Here is an activity to which the individual producer may well devote the energies that are often unwisely expended in adding to capacity or in fighting for 100 per cent operation in a time of 80 per cent demand. By creating new outlets the danger of a recurring surplus supply is reduced. As was well said by George M. Verity, president of the American Rolling Mill Co., in the discussion on Mr. Schwab's address, steel producers must establish a better liaison between the mills and their trade. They must make the customer's business their study, helping him to find the material best suited to his needs and assisting him in working out the problem of fabricating it to best advantage. When such service is given, new uses for steel will be found and the tonnage price of raw material will become a secondary consideration, since the steel user's main interest is in reducing his total manufacturing cost.

All three of Mr. Schwab's suggestions are practical and sound. They call for no radical departure from principles under which the industry has grown to its present stature. They urge no concerted action in regulating either prices or production. They are convincing counsel for more intelligent conduct of business, putting faith in voluntary cooperation and individual initiative. Most constructive of all and of largest significance is that part of the address dealing with new uses for steel. As THE IRON AGE often has pointed out, no other field holds such promise for united effort by the members of the institute and in no other activity can it find greater justification for its existence.

Economics of Steel Making

MYRON C. TAYLOR, chairman of the finance committee of the United States Steel Corporation, delivered last week at Columbia University an economic address on the steel industry that was erudite and informing. It would be helpful if there were equally masterly summaries of other major industries. An aggregation of such would go a long way toward illuminating our industrial and economic position. We shall try to analyze Mr. Taylor's survey and to correlate it with a broader one.

Mr. Taylor reports that the production of 48,000,000 tons of steel ingots in 1926 involved the labor of a million workers and the use of 200,000,000 tons of material. That material may be reckoned as comprising 70,000,000 tons of iron ore, 81,000,000 tons of coal and 14,000,000 tons of limestone, besides other things.

We are unable to follow the estimate of a million workers employed in the production of 48,000,000 tons of steel ingots. The Steel Corporation itself in 1926 employed a little over 250,000, and inasmuch as it produced about 42 per cent of all the steel and about 43 per cent of the iron ore, there is indicated a total occupation of about 600,000. On the basis of the Steel Corporation data the total employment would have been about 32,000 in the mining of iron ore, about 62,000 in mining coal and making coke and 61,000 in transportation, the remainder of the employment in this industry being in its metallurgy and manufacturing. This is, however, a measure of only the steel industry. Iron and steel together employ more persons. According to the census for 1925 about 50,000 were employed in iron mining and about 850,000 in metallurgy and manufacturing. If we con-

jecture about 100,000 in accompanying coal mining and coke making we should arrive at a total of about 1,000,000 for the iron and steel industry. Perhaps it was something like this that Mr. Taylor meant.

According to Mr. Taylor all workers of the iron and steel industry received an average of about $1,400 in the year, their average rate of wages being 12 per cent higher than the hourly average in all the industries covered in the recent report of the National Industrial Conference Board. The average of the Steel Corporation alone was higher than that, the figure for all employees being $5.94 per day, and $5.82 if the salaries of general administrative and selling force be excluded. The total payment for wages came to $1,846 as the average for the year. We may compare that figure with the average of $1,656 received by 1,800,000 workers in steam railroad transportation, which is another of our major industries. We may make further comparison with the estimate by Dr. W. R. Ingalls of the total national internal income in 1926 as 74.2 billion dollars, which would be $1,613 for the estimate of 46,000,000 workers. The total internal income is a direct function of work in one way or another, inasmuch as even dividends and interest must be expended in some form of work.

In Mr. Taylor's calculation the actual investment in the steel industry is about $4,750,000,000; but replacement cost, less accrued deterioration, would be at least $6,000,000,000. On the former basis the profit yield in 1927 was only 5.29 per cent, compared with 6.89 per cent in 1926 and 5.66 per cent in 1925. If computed on reproduction value the returns would be correspondingly smaller. Either way the capital estimates are on the basis of an overbuilt industry, the steel works having an aggregate annual capacity of 60,000,000 tons of open-hearth and Bessemer steel ingots compared with a maximum requirement of 50,000,000 tons. No industry can operate continuously at 100 per cent of rated capacity, but also it may be said that no industry requires a surplus of 20 per cent.

In so measuring the country's excess capacity in steel Mr. Taylor definitely confirms Mr. Schwab's judgment, expressed last Friday, that "the technological developments resulting in improved processes and enlarged units alone will render unnecessary for a considerable period the building of new plants to meet increased demand."

The Culmination of Research

A YEAR ago, and again last Friday, the program of the American Iron and Steel Institute contained an unusual feature, worthy of imitation by other engineering and industrial associations. Rarely indeed do the faithful listeners hear anything beyond sober technical details. Judge the glad relief when a year ago S. M. Kintner and last week W. B. White gave vivacious accounts of those by-products of industrial research which help make the world more livable and enjoyable. By means of such researches the iron master becomes less a producer of humdrum bolts and spikes, and turning patron of the arts gives the artist more perfect instruments for expression and devices whereby his art may be broadcast so that all who listen may be uplifted. A year ago Mr. Kintner, in illustrating recent advances made possible by the vacuum tube, recreated for his delighted audience the weary but resonant voices of the "Two Black Crows." On Friday, Ernest Schelling (an equally human virtuoso) "discussed" Mr. White's paper on the testing of piano wires by drawing forth, from a Steinway grand piano, bells and rippling waves, floating clouds and dancing feet and stormy passion.

With Mr. Schelling we are glad this is not yet an altogether wireless world.

Automobiles Take More Steel

IN the manufacture of automobiles, trucks and replacement parts about 25 per cent more steel is being used this year than in 1926, hitherto the record year. A more precise statement will be made available by the annual presentation of THE IRON AGE at the beginning of the new year, dealing with "Where steel went in 1928." As compared with 1926 there is an increase in the number of automobiles and trucks made, and an increase in the consumption of steel per unit. While there is an increase this year in the total steel production, that is a smaller increase, and the result will be a record high proportion of the total steel passing into the automotive industry, probably about 17 per cent, against 14½ per cent shown by our presentation for 1926.

The Department of Commerce reports 413,722 passenger cars and trucks made in the United States in September, and adding Canada at 21,193 gives a total for the month of 434,915. With a slight upward revision now made for August that month's total is 492,601. The total of cars and trucks, United States and Canada, for nine months is 3,671,727.

Whether there was an actual decrease in rate from August to September is a question. Counting Ford at five days a week and others at five and a half days there was a decrease in working time from August to September of about 15 per cent, but the Department of Commerce reports production as "factory sales," and the extra Saturday, Sunday and holiday in September might perhaps be regarded as increasing rather than diminishing the month's opportunities. Striking a daily average for the two months and rating October at 95 per cent, November at 90 per cent and December at 70 per cent would make a year's total of 4,850,000, which may thus be taken as a fairly liberal estimate.

Given the number of units produced, a weight factor is requisite. Our annual returns of "where steel went," divided by the number of cars and trucks produced, showed decreasing quantities per unit through 1924, as Ford and other light cars became more prominent. Thereafter substantial increases occurred, for several reasons, more closed bodies, more all-steel bodies, in 1927 the light production of Ford and of late the trend of many cars, including Ford, to be made heavier as the much more powerful engines required a stiffening all around. In our present estimate we assume 15 per cent more steel per unit than was shown for 1926, which involves a slight increase over 1927. The increase over 1926 in the number of units is about 8 per cent. With more cars in service, more replacement parts are produced.

As to steel production, this year's steel ingot total promises to run above 49,000,000 tons. With so much fine steel being made, the proportion of rolled steel to ingots may be taken at 73 per cent against the

74 per cent of 1926, which would make 3 per cent increase in rolled steel production.

Putting all these factors together, we have about 25 per cent increase in automobile steel from 1926 to 1928 and an increase in the automobile percentage of total steel from 14½ to about 17.

It is of interest just at the moment that lately the proportion of the steel output taken for automobiles has been considerably above the year's average, probably somewhat over 20 per cent.

Standard Machine Tool Market

IN an editorial discussion of "British Machine Tools," inspired by the recent machinery exposition at Olympia, *Engineering* lays emphasis on the still existing market for standard machine tools as distinguished from special purpose machinery required in mass production. Of course, such a market remains in Great Britain in a probably greater ratio of importance than in the United States. At the present time the American demand for standard tools is greater than for some years, riding along on the wave of buying of more or less special machinery.

The London editorial goes on to say: "We hear a great deal in these days of the progress of the American special machine, and of the wonderful developments which are taking place as a result in manufacturing plants of the United States. While all the world may become thus highly organized mechanically in some distant future, it cannot be contended that at present the world demand for tools has been exhausted when the requirements of these specialized factories have been met."

The point will be conceded naturally, but with the reservation, as applied to the United States, that the use of special purpose machinery is not by any means confined to the large establishments. The English writer cites the extreme case of immense plants which manufacture for and maintain the Bell Telephone system, and continues in a general discussion of the trade in Great Britain, with pertinent comment, as follows:

> All said and done, such trade forms only a part of the total, even in such a country as the United States. The bulk of the work is done on more general lines, simply because a great deal of it will not, even with the application of the utmost amount of ingenuity, lend itself to stereotyping. Here (in England) where our manufacturing methods are not at their best, cast on the same gigantic proportions, the works requiring special machines are relatively few and the demand at best is for single tools, instead of dozens. In such cases it may be attractive to the buyer to deal in the American market. The factory methods of that country have been so loudly proclaimed, it is natural that he should wish to adopt a tool successfully applied over there. He is also faced with the possibility that if he tries to get his requirements met over here and allies himself with a toolmaker for the purpose, the machine produced may be inordinately expensive. This is the unavoidable consequence of the small demand. Yet it is satisfactory to know that, even in such lines, our makers can make headway, and that today designers and makers are ahead of the requirements of the most modern factories in the country.
>
> We have referred to the non-specialized work to be done. Of this there is a great amount all over the world, including both the United States and this country. While American special machines may contribute in no small degree to our retained imports, it is not generally accepted that the special purpose tool is imported largely by this country from Germany. If this is so, it follows that for some reason or other Germany is supplying us with tools which our makers could equally well produce, which certainly should not be the case.

The United States is dotted over with manufacturing plants and such establishments as railroad repair shops, in which standard machinery is used to a greater or less extent and always will be used. Unfortunately, perhaps, for their makers, a characteristic of machines of this class is that even in their old age they can do the work required, though at much less speed and much higher cost when compared to the production by modern tools of similar type. In the last few years replacement of antiquated equipment has been much slower than it should have been, but signs now are that business from these sources will result in a quickened market for standard tools, though at the same time, in many cases, obsolete machinery will be replaced by specialized tools.

Record Run on a Merchant Furnace

RECORDS of blast duration have not been reported as carefully as daily tonnage production of blast furnaces. Stack "A" of the Toledo Furnace Co. ran on one lining from Nov. 6, 1919, to Aug. 22, 1928—a period of 8 years, 9 months and 16 days. This is not the longest one-blast period ever reported, as one small furnace was in constant operation on the same lining for over 10 years. But that small stack made, nearly all that time, one grade of iron—standard Bessemer pig.

Outstanding in the achievement of the stack at Toledo is the fact that it made during its run 1,823,251 tons of pig iron—far in excess of any tonnage ever before produced on one lining. The average was 564 tons a day over the entire 3212 days. What is still more notable, the furnace steadily increased its daily average by years, so that, during its last year of operation, it made more daily tonnage than during any other year. Its average output in 1926 was 602 tons a day; in 1927, 614 tons; in 1928, 627 tons. The amount of "off" iron made averaged only 1.8 per cent. The amount ran up sharply during the year of the coal strike, owing to the use of poor coal. Leaving out that year, the "off" iron ran only 1.2 per cent of the total, while during the last three years it averaged less than ½ per cent of "off" metal.

This record would not be such an exceptional achievement for a steel works furnace employed in making basic iron continually. But the Toledo furnaces are run on merchant pig iron, and almost every variety except Bessemer is made to meet the specifications of more than 200 customers. To fill the requirements of this trade this furnace has made all grades of foundry iron, from 1 to 3 per cent in silicon; malleable iron, from 1.25 to 2.75 per cent in silicon; and standard basic. And it has, during the entire period, been frequently shifted from one grade to another—18 different specifications having been made in one 28-day period.

Before this run the furnace was rebuilt and provided with a new shell. The stack, as rebuilt, had an 18-ft. hearth diameter, a 24-ft. bosh and a height of 84 ft. There are no cooling plates above the mantle. After the furnace was blown out, the lining was found smooth and true to circle, and showed no signs of scaffolding. It was 20 in. thick at top of stack, 1 ft. at the middle, and 3 ft. at the mantle. The salamander in the hearth, 214 tons, contained various grades of pig iron made in the furnace. Usually the amount of salamander removed when a furnace is blown out is much larger.

Sharp Increase in October Iron Output

Estimates Indicate a Daily Rate of 108,800 Tons, the Largest in 17 Months—Net Loss of Two Furnaces

ESTIMATES of pig iron production for October indicate a sharp increase over September. Figures collected by wire on Tuesday, Oct. 30, from companies estimating their output for the last three days in most cases, show the October total to be approximately 3,372,000 gross tons, or nearly 108,800 tons per day for the 31-day month. Compared with 102,077 tons per day made in September, this is an increase of about 6.5 per cent. The October daily rate is therefore the largest in the last 17 months, or since May, 1927, when it was 109,385 tons per day. It is also the largest daily rate for October since 1918, when it was 112,482 tons. In fact, there have been but two October daily rates exceeding that of this year—in 1918 and 1916.

Reports indicate a net loss of two furnaces during October—eight furnaces were blown in and 10 were shut down. Apparently, therefore, 195 furnaces were operating at the end of the month as against 197 on Oct. 1.

Actual production returns for October will be published in THE IRON AGE of Nov. 8 and the estimates of daily rate and of furnaces in blast may be somewhat altered by the final figures.

Steel Company Earnings

Steel Corporation in Nine Months Has Earned $8.17 per Share of Common Stock

EARNINGS of the United States Steel Corporation for the third quarter of 1928 were at a rate of $3.31 per share of common stock (after providing for the preferred stock), compared with $2.75 in the second quarter and $2.15 for the third quarter of 1927. The earnings for the nine months of 1928 stand at $8.17, or more than enough for the regular 7 per cent annual common dividend, with what comes in the fourth quarter available for surplus minus appropriations for betterment or expansion. On the basis of the present issue of 7,116,235 shares of common stock, the net earnings available to common stockholders was, for the first nine months of 1925, 1926 and 1927, $6.74, $9.35 and $7.74 respectively.

The net earnings before deducting either preferred or common stock dividends were $29,886,259. For the third quarter of 1927 they were $21,585,425, and for the second quarter this year, $25,868,758. The surplus for the three quarters amounts to $20,811,898, in the face of a larger depreciation for the third quarter than for the larger reductions on this account made for the second quarter. The accompanying table shows the statement, including earnings of recent years.

Bethlehem's Prospects Good

The Bethlehem Steel Corporation's net income in the September quarter was $4,272,528, equivalent after preferred dividends to $1.43 a share on the common stock. Although off slightly from the $4,529,328 or $1.57 a share earned in the June quarter this year, it was a large gain over the $2,788,053 or 61c. a share earned in the third quarter last year. Net income for the nine months ended Sept. 30, 1928, totaled $12,186,974, compared with $13,454,771 in the first nine months of 1927 and with $15,764,851 in the corresponding period of 1926.

Although the earnings for the first three quarters this year are the lowest in three years, this does not indicate a decline in the full year's net, as the last quarter of 1927 was the lowest of the year and this year it seems likely to be the highest. In commenting on the situation, President Eugene G. Grace states that current operations are at approximately 94 per cent of capacity, the highest in the company's history, and that the price situation at the end of the third quarter was decidedly better than at the end of the second. Billing prices in the third quarter had shown no important change from the second but the benefit of the price advances on the heavier products is now being felt and should be reflected in fourth quarter shipments.

Unfilled orders, as of Sept. 30, 1928, amounted to $58,725,602, representing bookings of 634,000 tons, as compared with $51,761,908 or 515,000 tons on June 30, and with $52,321,794 or 419,000 tons on Sept. 30, 1927.

Other Companies Not Up to 1926 Totals

Other large steel companies, as the accompanying table shows, in most cases earned more in the first nine months this year than in the corresponding period of 1927, but failed to equal their figures for the first three quarters of 1926. However, nearly all the companies show satisfactory returns in the past quarter and indicate recovery from the slump of 1927.

Earnings of United States Steel Corporation

EARNINGS IN RECENT YEARS

Quarters	1928	1927	1926
1st	$40,934,032	$45,584,725	$45,061,285
2nd	46,932,986	46,040,460	47,814,105
3rd	52,148,476	41,373,831	52,626,826
4th	.....	31,247,529	53,502,525

EARNINGS FOR THIRD QUARTER

		Total Earnings
July, 1928		$16,133,679
Aug., 1928		18,597,178
Sept., 1928		17,417,619
Total earnings after deducting expenses, taxes and interest		$52,148,476
Less charges and allowances for depletion, depreciation and amortization, as follows:		
To subsidiary companies	$14,837,905	
To sinking funds on corporation bonds	2,937,113	
		17,775,018
Net income		$34,373,458
Deduct: Interest corporation bonds	$3,991,128	
Premium on bonds redeemed	496,071	
		4,487,199
Balance		$29,886,259
Dividends:		
Preferred 1¾ per cent	$6,304,919	
Common, 1¾ per cent	12,453,411	
		18,758,330
Surplus for the quarter		$11,127,929

Comparison of Earnings of Leading Steel Companies

(In Thousands of Dollars)

Company	Third Quarter 1928	Second Quarter 1928	Third Quarter 1927	First 9 Mo. 1928	First 9 Mo. 1927	First 9 Mo. 1926
Bethlehem Steel Corporation	4,273	4,529	2,788	12,186	13,455	15,765
Central Alloy Steel Corporation	1,161	1,265	810	3,401	2,648	3,432
Donner Steel Co., Inc.	404	307	58	796	288	650
Gulf States Steel Co.	140	204	150	682	521	565
Inland Steel Co.	2,089	2,550	1,244	6,931	5,590	5,035
Jones & Laughlin Steel Corporation	4,505	4,241	2,607	11,649	9,842	11,760
Otis Steel Co.	951	907	468	2,694	1,401	2,857
Republic Iron & Steel Co.	1,281	1,054	502	2,822	2,535	3,755
Superior Steel Corporation	15	31	*33	*17	*117	276
United States Steel Corporation	29,886	25,869	21,585	77,087	74,050	85,433
Youngstown Sheet & Tube Co.	2,718	2,492	1,539	6,872	5,857	11,994
Total	47,423	43,449	31,718	125,103	116,070	141,522
Producers of Pig Iron, Coal and Coke						
By-Products Coke Corporation	328	404	432	1,098	1,080	....
M. A. Hanna Co.	723	543	418	1,170	777	534
Virginia Iron, Coal & Coke Co.	*28	*47	*43	*96	*180	*13

*Deficit.

Colored plug fuses for electric light circuits, a color for every size, have been put on the market by the Trico Fuse Mfg. Co., Milwaukee.

Iron and Steel Markets

Railroad Demand Expanding

Rail Purchases and Equipment Programs May Offset Tapering Steel Requirements of Automobile Industry —Pig Iron Prices Still Rising

IMPENDING purchases of railroad equipment and seasonal orders for rails, a sustained demand for pig iron that has forced prices to still higher levels and further signs of strength in finished material, particularly bars, are encouraging features of the iron and steel market.

Developments of the week, however, do not all point in the same direction. The steady advance in heavy steel scrap at Pittsburgh, which began in July, has been interrupted by a 25c. a ton decline. Further evidences of the tapering operations of the automobile industry have been brought to light, and a gradual reduction of mill backlogs with a corresponding shortening of deliveries is indicated.

Steel production, however, holds at close to 90 per cent, and pig iron output has reached a record rate for the year.

Telegraphic estimates of pig iron production for October collected by THE IRON AGE indicate a total of 3,373,000 gross tons for the 31 days, or 108,800 tons per day. The daily output exceeds that of September by 6.5 per cent and is the highest in 17 months. It was also the best average for October reached in any year except 1918 and 1916.

Of particular interest in the steel trade are accumulating indications that diminishing demands from some consumers are likely to be offset by heavier demands from others.

The seasonal rail buying movement brought out orders during the week for 159,600 tons from the Pennsylvania and 50,000 tons from a Western road. The St. Paul is in the market for 50,000 tons, and early inquiries are expected from the Burlington, the North Western and the Illinois Central. While rail orders may be smaller than last year, options on additional tonnage are likely to be proportionately larger, as was the case with the Pennsylvania.

Railroad equipment inquiries include one for 3000 cars from the Missouri Pacific. Buying programs to be launched after election call for upward of 40,000 cars, more than half of which are likely to be placed before the close of the year. Freight car orders so far this year have totaled less than 30,000 cars, the poorest showing since 1921.

Another outlet for steel that is reopening is shipbuilding, which is being stimulated by the Merchant Marine act. The steel required for five vessels to be built on the Atlantic seaboard totals 17,200 tons.

Fabricated steel awards, including an informal contract for 11,300 tons for New York subways, aggregate nearly 42,000 tons, the largest total in six weeks.

Automobile output, although undergoing a seasonal decline, is nevertheless higher than usual for this time of the year. Steel orders for the new Chevrolet model have been delayed a week or two, but the demands of the Ford company are increasing in conformity with a steady gain in output, which has now reached more than 5500 units daily.

Shipments of finished steel exceed bookings in virtually all districts except Chicago. Pressure for deliveries is heavy in both the Cleveland and Chicago districts, specifications in the latter market having been the largest for any week this year.

Finished steel prices are strong in most centers, with steel bars well established at 1.95c., Pittsburgh, or $1 a ton above the recent minimum. Despite occasional shading on black sheets in the East, most reports indicate a firm sheet market, with advances of $2 to $3 a ton for next quarter a probability.

The tin plate price for the first half of 1929, soon to be named, is unlikely to show any change from the present quotation of $5.25 per base box, Pittsburgh.

The upward swing of pig iron prices has not yet been halted. In the Chicago, Valley and Buffalo markets all grades went up 50c. a ton. At Philadelphia, basic pig iron rose 25c. a ton on a 10,000-ton sale. A scarcity of basic grade is particularly pronounced in the Valleys. Sales of foundry and malleable iron at Cleveland totaled 42,000 tons, compared with 38,000 tons the previous week. Furnace stocks of merchant iron have been sharply reduced.

The reaction in scrap prices at Pittsburgh, although interpreted there as reflecting less urgent demands on the steel mills, finds little support in other important market centers. Although a less buoyant situation is reported at Youngstown and Philadelphia, stronger prices are the rule elsewhere, with heavy melting scrap 50c. a ton higher at Chicago and Cleveland and 25c. higher at St. Louis.

Spot furnace coke prices at Connellsville, although unchanged, are growing easier in keeping with an increase in available supplies of the fuel.

Exports of iron and steel in September, although 20 per cent below those of August, were 39 per cent larger than a year ago. Exports in the first nine months, excluding scrap, showed a gain of 14½ per cent over the same period in 1927.

THE IRON AGE composite price for finished steel has advanced from 2.362c. to 2.369c. a lb., the highest figure since June, 1927. The pig iron composite has risen from $17.92 to $18.25 a ton—the first time it has been above $18 in more than a year.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Oct. 30, 1928	Oct. 23, 1928	Oct. 2, 1928	Nov. 1, 1927
No. 2 foundry, Philadelphia	$20.76	$20.76	$20.76	$19.76
No. 2, Valley furnace	**17.50**	17.00	17.00	17.50
No. 2, Southern, Cin'ti	19.94	19.94	19.94	19.69
No. 2, Birmingham	16.25	16.25	16.25	16.00
No. 2 foundry, Chicago*	**19.50**	19.00	18.50	18.50
Basic, del'd eastern Pa	19.75	19.75	19.00	20.00
Basic, Valley furnace	**17.50**	17.00	17.00	17.00
Valley Bessemer, del'd P'gh	**19.76**	19.26	19.01	19.76
Malleable, Chicago*	**19.50**	19.00	18.50	18.50
Malleable, Valley	**18.00**	17.50	17.25	17.50
Gray forge, Pittsburgh	**18.76**	18.26	18.26	18.76
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	90.00
Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh	33.00	33.00	32.00	33.00
O.-h. billets, Pittsburgh	33.00	33.00	32.00	33.00
O.-h. sheet bars, P'gh	33.00	33.00	32.00	34.00
Forging billets, P'gh	38.00	38.00	38.00	38.00
O.-h. billets, Phila	37.30	37.30	37.30	38.30
Wire rods, Pittsburgh	42.00	42.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb	1.90	1.90	1.90	1.75
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.07
Iron bars, Chicago	2.00	2.00	2.00	1.85
Steel bars, Pittsburgh	**1.95**	1.90	1.90	1.75
Steel bars, Chicago	2.00	2.00	2.00	1.85
Steel bars, New York	**2.29**	2.24	2.24	2.09
Tank plates, Pittsburgh	1.90	1.90	1.90	1.75
Tank plates, Chicago	2.00	2.00	2.00	1.85
Tank plates, New York	2.22½	2.22½	2.22½	2.09
Beams, Pittsburgh	1.90	1.90	1.90	1.75
Beams, Chicago	2.00	2.00	2.00	1.85
Beams, New York	2.19½	2.19½	2.19½	2.09
Steel hoops, Pittsburgh	2.20	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Oct. 30, 1928 Cents	Oct. 23, 1928 Cents	Oct. 2, 1928 Cents	Nov. 1, 1927 Cents
Sheets, black, No. 24, P'gh	2.75	2.75	2.75	2.80
Sheets, black, No. 24, Chicago dist. mill	2.85	2.85	2.75	3.00
Sheets, galv., No. 24, P'gh	3.50	3.50	3.50	3.70
Sheets, galv. No. 24, Chicago dist. mill	3.60	3.60	3.60	3.85
Sheets, blue, 9 & 10, P'gh	2.00	2.00	2.00	2.10
Sheets, blue, 9 & 10, Chicago dist. mill	2.10	2.10	2.10	2.25
Wire nails, Pittsburgh	2.55	2.55	2.55	2.50
Wire nails, Chicago dist. mill	2.60	2.60	2.60	2.55
Plain wire, Pittsburgh	2.40	2.40	2.40	2.40
Plain wire, Chicago dist. mill	2.45	2.45	2.45	2.45
Barbed wire, galv., Pittsburgh	3.20	3.20	3.20	3.20
Barbed wire, galv., Chicago dist. mill	3.25	3.25	3.25	3.25
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	*$17.75*	$18.00	$17.00	$14.50
Heavy melting steel, Phila	16.00	16.00	16.00	14.00
Heavy melting steel, Ch'go	**14.50**	14.00	13.25	11.50
Carwheels, Chicago	**14.25**	13.75	13.75	13.25
Carwheels, Philadelphia	16.50	16.50	16.50	15.50
No. 1 cast, Pittsburgh	15.50	15.50	15.00	14.75
No. 1 cast, Philadelphia	**17.50**	17.00	17.00	16.50
No. 1 cast, Ch'go (net ton)	15.50	15.50	15.00	13.50
No. 1 RR. wrot., Philadelphia	15.50	15.50	15.50	15.50
No. 1 RR. wrot., Ch'go (net)	12.75	12.75	12.00	9.75
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.90	$2.90	$2.75	$2.85
Foundry coke, prompt	3.75	3.75	3.75	4.00
Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	**16.25**	15.62½	15.25	13.25
Electrolytic copper, refinery	**15.75**	15.25	15.00	13.00
Zinc, St. Louis	6.25	6.25	6.25	5.80
Zinc, New York	6.60	6.60	6.60	6.15
Lead, St. Louis	6.32½	6.32½	6.32½	5.95
Lead, New York	6.50	6.50	6.50	6.25
Tin (Straits), New York	**49.25**	48.75	49.75	57.50
Antimony (Asiatic), N. Y	10.50	10.50	11.50	11.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Operations Unaffected by Slight Letup in Urgency of Demand—Pig Iron Up 50c.—Scrap Easier

PITTSBURGH, Oct. 30.—In a general way, incoming business in steel is falling behind shipments, but the difference has been too slight to affect either steel works or rolling mill operations, which at the close of October are not far from the high point of about the middle of the month. Rail business now reaching the mills in rather good volume is clear gain, since at this time of the year shipments of rails do not amount to much. In strips and sheets, there is almost a balance between shipments on old orders and fresh tonnage releases. In bars, plates and shapes, shipments are drawing pretty heavily against backlogs, this being apparent less in mill operations than in the ability of manufacturers to promise more prompt deliveries than they would a few weeks ago.

There is still a strong hope that the railroads will buy cars and locomotives, but it still is a hope largely unrealized. Cheerful reports from the oil industry possibly mean an improved demand next spring for oil well pipe, but right now there is only moderate activity in that product, even seamless pipe having slipped some in demand in the past week or two. It is commonly accepted that automotive industry's requirements will be smaller in November and December than they have been over most of the year to date.

Taking all factors into the picture, and adding the fact that with the approach of the end of every year there is some influence upon demand in inventory considerations, the common opinion is that the high point of fall activity has been reached and passed. But there is no expectation of a big recession from current levels.

The scrap market has stopped advancing in the past week and has eased a little both as to offerings and prices. This probably reflects the passing of the urgency in the demand for steel and consequently in the need of driving production to the limit.

The shortage of available supplies of basic iron has found reflection in a price advance of 50c. a ton, with a sale of 10,000 tons and several other good-sized tonnages in prospect. All grades of iron have moved up 50c. a ton in the past week, but sales and demand count less heavily in foundry, malleable and Bessemer grades than in basic iron, the merchant production of which is moderate, while steel companies do not seem to care to part with any surplus supplies they may have.

There is a very firm tone to the steel market. Bars are clearly quotable at a minimum of 1.95c. On new business, strip makers want much more than they are getting on most of the current contract shipments. Sheet makers not only are firm at current prices, but are beginning to talk about higher prices on first quarter contracts.

Pig Iron.—A horizontal advance of 50c. a ton has been definitely established in pig iron prices in this market. One sale of 10,000 tons of basic iron has been made by a Valley producer for shipment to an Ohio steel company at $17.50, furnace, or $19.15, delivered, the freight from shipping point being $1.65 per ton. The delivered price is equal to $17.89 at either Youngstown or Cleveland, as the freight rate from those points to the destination of this tonnage is $1.26 per ton. Besides numerous smaller lots, there has been a sale of 1500 tons of No. 2 foundry iron at $17.50, Valley furnace. The support in sales of the advance in Bessemer and malleable grades is less imposing than that in the other grades, and the principal factor in the higher prices is the smallness of current production available for open market sale. There is more interest on the part of melters in basic iron than in the other grades, although a considerable tonnage of foundry iron for shipment over the next three or four months is included in total bookings of 75,000 tons reported by one merchant producer as the business of the past month. The Edgewater Steel Co. has inquired for 2000 to 4000 tons of basic iron for December-January shipment. It is said that the Sharon Steel Hoop Co., in preparation for the blowing out of its own furnace at Lowellville, Ohio, is seeking a round tonnage of basic iron, and it is generally believed that the Central Alloy Steel Corporation will buy more. The Valley steel manufacturers seem to have no basic iron for sale, and that also is the situation with Pittsburgh district companies, which ordinarily make more than their own requirements. Merchant production of basic iron is somewhat larger than it has been, as the Claire furnace, Sharpsville, Pa., now is running on that grade. It is reported that preparations are being made for starting the Struthers furnace, Struthers, Ohio; owners have secured an option on some ore and the work of repairing and relining the furnace is under way with an idea of blowing in about Dec. 15. The Jones & Laughlin Steel Corporation has put on the one idle Eliza furnace and now has all furnaces except the Soho stack in production.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.50 to $18.00
Bessemer	18.00
Gray forge	17.00
No. 2 foundry	17.50
No. 3 foundry	17.00
Malleable	18.00
Low phos., copper free	26.50 to 27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Hot-Rolled Flats.—Incoming business in strips is almost equal to shipments and both still are on a high scale. Demands for the Ford Motor Co. are very heavy, and, while little steel is moving to the maker of another low-priced car, it is figured that merely the production of dealers' displays of a new model will give heavy impetus to the steel requirements of this builder. The new base prices and the new card of extras now are being quoted by almost all makers, but only a small amount of business has been written on the new schedules, owing to the fact that so many consumers are covered on their requirements for the remainder of this year. On such new business as is developing, the card which produces the highest price is used by some makers, whose need of additional business is not pressing.

Cold-Rolled Strips.—Shipments are very heavy and so is incoming business. Several producers find tonnage releases substantially equal to shipments on older orders. Makers are holding firmly to 2.85c., base Pittsburgh, on new business.

Ferroalloys.—Makers of ferrosilicon have announced a continuance of this year's prices for 1929, or $83.50 for 50 per cent and $130 for 75 per cent on contracts. No advance is expected on ferrophosphorus for shipment next year. Ferromanganese also is to continue at its present price on 1929 contracts. Deliveries are good against existing contracts in keeping with the high rate of steel works operations, but there is no rush on the part of consumers to sign contracts for next year. In view of a guarantee against a decline in the price of ferromanganese, it is not surprising that buyers are slow to cover.

Semi-Finished Steel.—The market is quite firm at $33, Pittsburgh and Youngstown on billets, slabs and sheet bars. On a few small lots of billets, which had to be delivered more promptly than most makers could promise, $34, Pittsburgh, was obtained. This price, however, was largely a delivery premium price as consumers generally are getting good deliveries on contracts, some of which are for third quarter and carry the lower price that ruled in that period. Specifications generally are in keeping with the fact that sheet and strip mill operations are averaging close to physical capacity. Wire rods are steady at $42, base Pittsburgh or Cleveland, and are moving well.

Bars, Plates and Shapes.—Bars now appear to be unobtainable at less than 1.95c., base Pittsburgh, and that is as low as some makers will go on new business in plates and shapes, but strengthening of prices is not as complete in the two latter products as in bars, because of variations in the order books and the size of the current demands. Mills at no time have been as heavily obligated on plates as on either shapes or bars and have had better bookings of bars than shapes. It is, therefore, natural that bar prices should show strength in advance of the other products. Bars are quotable at 1.95c. to 2c., but 1.90c. has not disappeared on desirable tonnages of plates and shapes. It is generally believed that an effort will be made to further stiffen prices on first quarter business. In new demands and specifications, bars make a better showing than shapes and plates. Demand for fabricated steel is rather dull.

Rails and Track Supplies.—Rail bookings of the local mill have been further enhanced by the distribution of the Pennsylvania Railroad orders for a total of 159,600 tons. There has not been a corresponding gain in bookings of the track fastenings, as the railroads now follow a policy of ordering spikes, tie plates, etc., when track laying starts. Light-section rails are very quiet and small spikes are dull.

Wire Products.—In a general way, business is making a favorable show-

The Iron Age Composite Prices

Finished Steel

Oct. 30, 1928, 2.369c. a Lb.

One week ago	2.362c.
One month ago	2.362c.
One year ago	2.293c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

Oct. 30, 1928, $18.25 a Gross Ton

One week ago	$17.92
One month ago	17.84
One year ago	17.54
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$18.25	Oct. 30;	$17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c. to 2.00c.
F.o.b. Chicago	2.00c. to 2.10c.
Del'd Philadelphia	2.27c. to 2.32c.
Del'd New York	2.29c. to 2.34c.
Del'd Cleveland	1.92½c. to 2.05c.
F.o.b. Cleveland	1.90c. to 2.05c.
F.o.b. Lackawanna	2.05c. to 2.10c.
F.o.b. Birmingham	2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50 and 60-ft. lengths	2.00c.
F.o.b. Pittsburgh mills, cut lengths	2.25c.
F.o.b. Birmingham	2.15c.

Rail Steel

F.o.b. mills east of Chicago dist.	1.85c.
F.o.b. Chicago Heights mill	1.95c.

Iron

Common iron, f.o.b. Chicago	2.00c. to 2.10c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mills	1.90c. to 2.00c.
F.o.b. Chicago	2.00c. to 2.10c.
F.o.b. Birmingham	2.15c.
Del'd Cleveland	2.09c. to 2.19c.
Del'd Philadelphia	2.15c. to 2.25c.
F.o.b. Coatesville	2.05c. to 2.15c.
F.o.b. Sparrows Point	2.05c. to 2.15c.
F.o.b. Lackawanna	2.00c. to 2.10c.
Del'd New York	2.22½c. to 2.32½c.
C.i.f. Pacific ports	2.20c. to 2.30c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mills	1.90c. to 2.00c.
F.o.b. Chicago	2.00c. to 2.10c.
F.o.b. Birmingham	2.15c.
F.o.b. Lackawanna	2.00c. to 2.10c.
F.o.b. Bethlehem	2.05c. to 2.15c.
Del'd Cleveland	2.09c. to 2.19c.
Del'd Philadelphia	2.11c. to 2.21c.
Del'd New York	2.19½c. to 2.29½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base per Lb.
Narrower than 6 in., P'gh	2.00c.
6 in. and wider, P'gh	1.90c.
Narrower than 6 in., Chicago	2.10c.
6 in. and wider, Chicago	2.00c.

*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.25c.
Shafting, ground, f.o.b. mill	*2.55c. to 3.50c.
Strips, P'gh	2.75c. to 2.85c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	3.00c.
Fender stock, Pittsburgh	4.25c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.55
Galvanized nails	4.55
Galvanized staples	3.25
Polished staples	3.00
Cement coated nails	2.55

	Base Per 100 Lb.
Bright plain wire, No. 9 gage	$2.40
Annealed fence wire	2.55
Spring wire	3.40
Galv'd wire, No. 9	3.00
Barbed wire, galv'd	3.20
Barbed wire, painted	2.95

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base per Lb.
Nos. 9 and 10, f.o.b. P'gh	2.00c.
Nos. 9 and 10, f.o.b. Chicago dist.	2.10c.
Nos. 9 and 10, del'd Cleveland	2.19c.
Nos. 9 and 10, del'd Philadelphia	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham	2.15c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.75c.
No. 24, f.o.b. Chicago dist. mill	2.85c.
No. 24, del'd Cleveland	2.94c.
No. 24, del'd Philadelphia	3.07c. to 3.17c.
No. 24, f.o.b. Birmingham	2.90c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.85c. to 3.90c.
No. 24, f.o.b. Pittsburgh, B grade	3.65c. to 3.70c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill	3.60c.
No. 24, del'd Cleveland	3.69c.
No. 24, del'd Philadelphia	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham	3.65c. to 3.70c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c.
No. 28, f.o.b. Chicago dist. mill	3.00c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. $11.20	25-lb. coating I.C. $16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.75c.

S.A.E. Series Numbers		Alloy Differential	Net Price 100 Lb. Bars
2000	(½% Nickel)	$0.25	$3.00
2100	(1½% Nickel)	0.55	3.30
2300	(3½% Nickel)	1.50	4.25
2500	(5% Nickel)	2.25	5.00
3100	Nickel Chromium	0.55	3.30
3200	Nickel Chromium	1.35	4.10
3300	Nickel Chromium	3.80	6.55
3400	Nickel Chromium	3.20	5.95
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50	3.25
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70	3.45
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05	3.80
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35	3.10
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45	3.20
5100	Chromium Spring Steel	0.20	2.95
6100	Chromium Vanadium Bars	1.20	3.95
6100	Chromium Vanadium Spring Steel	0.95	3.70
9250	Silicon Manganese Spring Steel (flats)	0.25	3.00
	Rounds and squares	0.50	3.25
	Chromium Nickel Vanadium	1.50	4.25
	Carbon Vanadium	0.95	3.70

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a $5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 Lb.
Spikes, ⅝ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	45	19½	⅛ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	42½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	⅛ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	8
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1⅝ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 4½ in.	46	3¼ to 4½ in.	— 9
5 to 6 in.	40		

Beyond the above base discounts, the following extra discounts are given:

Lap Weld Steel		*Charcoal Iron*
Under 5000 lb.	4 Fives	1 Ten
5000 lb. to 12,000 lb.	5 Fives	2 Tens
12,000 lb. to 21,000 lb.	6 Fives	2 Tens & 2½
21,000 lb. and over	7 Fives	2 Tens & 5

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in.	55	3¼ to 3½ in.	50
1¾ in.	39	4 in.	53
2 to 2¼ in.	34	4½, 5 and 6 in.	45
2½ to 2¾ in.	42		

Hot Rolled

2 and 2¼ in.	40	3¼ to 3½ in.	56
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Less carload, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

ing in comparison with other years at this season. Prices are firm, but there is still a lack of uniformity in the application of the extra 10c. per keg in carload lots of nails to others than jobbers.

Tubular Goods.—Line pipe still forms the bulwark of mill operations. While there are reports of improvement in the oil market, this development has not yet been translated into increased oil well pipe demands. Seamless pipe, which recently was so active for this purpose, particularly for shipment to California, is quieter and lapwelded oil country pipe still is very slow. Buttwelded pipe is moving very steadily, but individual orders are small. The Milwaukee maker of electrically welded pipe is reported to have taken 140 miles of 12 in. pipe for a line from the Jennings field in Zapata County, Tex., to Monterey, Mexico, for the Houston-Gulf Gas Co. In tubing, there is a fairly good movement of merchant tubes and a really good one in mechanical tubing.

Sheets.—There is no material letdown in the demand for sheets, and price ideas of producers are growing stronger. No great difficulty attends sales of black sheets at 2.75c., base, blue annealed at 2c., base, and galvanized at 3.50c., in which incidentally some effort is being made to eliminate the jobbers' preferential of 10c. per 100 lb. Higher prices are mentioned on first quarter business, with a possibility that an advance of $3 will be sought on black and galvanized sheets and a $2 a ton advance over present prices of body and blue annealed sheets. Mill operations remain well up toward physical capacity.

Tin Plate.—The recession in demand and mill operations appears to have ended and, while the market is far from active, it is doing better in both sales and mill engagement than it did recently. As the time approaches for the naming of 1929 first half prices for tin plate, it is becoming apparent that the present price of $5.25 per base box, Pittsburgh, for coke tin plate will be continued.

Cold-Finished Steel Bars and Shafting.—Specifications for this month will show some loss as compared with September, but in view of the heavy releases last month and the fact that specifications this month were against fourth quarter contracts carrying an advance of 10c. per 100 lb., it was expected that buyers would be cautious. Buyers generally appear to have accepted the advance, but it was not until about a week ago that 2.10c., base, disappeared.

Coke and Coal.—Spot furnace coke prices are the same as a week ago, but supplies are somewhat more ample and more sales are being made at the lower than at the higher limit of the price range. Producers are talking strongly as to prices on first quarter contract tonnages, because of the strong pig iron situation. There is the possibility of a good-sized order for coke for the Struthers Furnace Co., which is likely to be blown in in December. The Jones & Laughlin Steel Corporation has escaped the necessity of buying coke for the latest addition to its active blast furnace by firing some of the rectangular ovens at its Aliquippa works. Foundry coke is moving well both in spot sales and in specifications on contracts. There is too much coal for prices to show much strength. Prices are weak even on household fuel, which is in good demand, and prices are off 25c. a ton from those of a month ago. Slack coal still is a drug on the market.

Old Material.—The market has a slightly easier tone in the steel works grades, and heavy melting steel this week is quotable at $17.50 to $18, against $18 a week ago. Failure of the Steel Corporation to purchase, as was expected a week ago and its decision again yesterday to defer purchases, has exerted considerable influence upon dealers, as has also the fact that another Pittsburgh district steel company, which bought very little scrap during the rise from $14 to $18 in heavy melting steel and was expected to be a buyer, now appears to have escaped the necessity of purchasing. It is still hard for dealers to pick up large tonnages, but on the other hand there are definite tenders of heavy melting steel at $17.75. Melters generally are out of the market and, with less pressure for deliveries, dealers are not scrambling so urgently for supplies. Compressed sheets command the same prices as heavy melting steel and that also is the situation in Youngstown, where $18.50 was paid for both steel and compressed sheets. Turnings are slightly firmer and some rather high prices have been paid for single carloads of steel car axles for quick shipment, which have gone at $22.50 in such cases, or 50c. to $1 a ton above what can be obtained on orders for later delivery. The November scrap list of the Baltimore & Ohio Railroad contains 10,200 and the Pennsylvania Railroad list contains approximately 40,000 gross tons.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
Heavy melting steel	$17.50 to $18.00
Scrap rails	17.00 to 17.50
Compressed sheet steel	17.50 to 18.00
Bundled sheets, sides and ends	15.50 to 16.00
Cast iron carwheels	15.25 to 15.75
Sheet bar crops, ordinary	18.00
Heavy breakable cast	14.00 to 14.50
No. 2 railroad wrought	18.00
Heavy steel axle turnings	15.00 to 15.50
Machine shop turnings	11.50 to 12.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	19.00 to 19.50
Railr. coil and leaf springs	19.00 to 19.50
Rolled steel wheels	19.00 to 19.50
Low phos. billet and bloom ends	20.50 to 21.00
Low phos., mill plates	19.00 to 19.50
Low phos., light grade	18.00 to 18.50
Low phos., sheet bar crops	19.00 to 19.50
Hvy. steel axle turnings	15.00 to 15.50
Electric Furnace Grades:	
Low phos. punchings	18.50 to 19.00
Hvy. steel axle turnings	15.00 to 15.50
Blast Furnace Grades:	
Short shoveling steel turnings	12.50 to 12.75
Short mixed borings and turnings	12.50 to 12.75
Cast iron borings	12.50 to 12.75
No. 2 busheling	11.25 to 11.75
Rolling Mill Grades:	
Steel car axles	21.00 to 22.00
No. 1 railroad wrought	13.50 to 14.00
Sheet bar crops	18.00 to 18.50
Cupola Grades:	
No. 1 cast	15.50 to 16.00
Rails 3 ft. and under	18.00 to 18.50

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24), 25 or more bundles	3.70c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets	3.35c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd, base per 100 lb	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

McClintic-Marshall Co. Buys Buffalo Shop

The McClintic-Marshall Co. has acquired from the Bethlehem Steel Co. the Lackawanna Bridge Co., Buffalo, and has incorporated the plant as the McClintic-Marshall Co. of Buffalo. This fabricating shop was acquired by the Lackawanna Steel Co. before the latter was absorbed by the Bethlehem Steel Co. With the acquisition of this unit, the McClintic-Marshall Co. now has structural steel fabricating plants at Buffalo, Pottstown, Pa., Pittsburgh, Chicago and Los Angeles.

To Review Progress in Gas Welding

International Acetylene Association will hold its twenty-ninth annual meeting at the Congress Hotel, Chicago, Nov. 14, 15 and 16. The first day will be given over largely to committee activities. A feature of a later session will be an address by Prof. C. F. Keel of Basle, Switzerland, who will review the European practices in generating, handling and utilizing acetylene gas. A comprehensive series of reports on the use of oxy-acetylene welding in American industries will also be presented. Meetings on Nov. 15 will be held jointly with Gas Products Association.

The executive offices of the Boston Bridge Works, Inc., Boston, formerly at 47 Winter Street, are now at the company's works, Sixth and Binney Streets, Cambridge, Mass.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	*$33.00
Rerolling, under 4-in. to and including 1¾-in.	34.00
Forging	38.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$33.00

*Cleveland mill base on large billets, slabs and sheet bars is $33.

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.90c. to 2.00c.
Sheared	1.90c. to 2.00c.
Universal	1.90c. to 2.00c.

Wire Rods

	Per Gross Ton
*Common soft, base	$42.00
Screw stock	$5.00 per ton over base

*Chicago mill base is $43. Cleveland mill base, $42.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	10.00c.
Iron ore, Swedish, average 66% iron,	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	38c.
Manganese ore, Brazilian, African or Indian, basic 50%	37c. to 38c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.90 to $11.25

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.90 to $3.00
Foundry, f.o.b. Connellsville prompt	3.75 to 4.85
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	60c. to 80c.
Gas slack, f.o.b. W. Pa. mines	90c. to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$33.00
Domestic, 16 to 19%	32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

Per Gross Ton Furnace		*Per Gross Ton Furnace*	
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	95c. to 98c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium, fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$17.00 to $18.00
No. 2 lump, Illinois and Kentucky mines	18.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay

Per 1000 f.o.b. Works

	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅞ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 2½
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10 and 5
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base Per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00

Small Rivets

(7/16-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Steel Demands Hold to a High Level—Pig Iron Prices Advanced 50c. a Ton

CHICAGO, Oct. 30.—Miscellaneous users of steel, finding needs larger and mill deliveries less certain and more extended, have issued heavy specifications, with the result that the past week was one of the most active of the year. A part of this tonnage is attributed to an active spot rail business and in a small measure to the beginning of shipments against 1929 rail orders. Nevertheless, industry as a whole is reaching a higher level in production. Quantities of steel used by the automobile manufacturers have lessened but are still large, while agricultural implement makers are making heavier drafts against contracts. The use of forgings is expanding and more diversified, and local forge shops are holding to capacity output.

Sales of finished steel products are well up to the average of the past four weeks. The bulk of this tonnage is for nearby requirements, that is 30 to 60 days, which is the range of deliveries of plates, shapes and bars. The total volume of contracts for fourth quarter is larger than in the preceding three months.

Structural steel awards total 3000 tons and fresh inquiry is for 5000 tons. In Chicago, several municipal projects will come before voters in November.

Railroad equipment orders are light, but there are indications that the Santa Fe, the Wabash, the Illinois Central and the Chicago & North Western will soon announce car building programs.

Steel mill output remains steady at 85 per cent of capacity.

Pig Iron.—An advance of 50c. a ton on foundry, malleable and high phosphorus pig iron has been put in effect, making foundry iron $19.50 for the base grade and $20 for the No. 1 grade and malleable and high phosphorus $19.50. Total shipments in October are equal to, if not heavier, than those of the best previous month this year. Spot orders are numerous, many of them for fill-in tonnages for delivery over the remainder of the year. Several additional first quarter contracts have been placed, a Michigan user having ordered 4000 tons. The Chicago market is in the best position in about five years; stocks in the hands of users and producers are low and the demand is consistent and heavy. There is a possibility that the Mayville furnaces, now held in reserve, may be lighted. Reports are denied that basic iron is reaching Chicago by boat. That a shortage exists, however, is apparent because an order for 5000 tons has been turned down by a local producer.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$19.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.00
Malleable, not over 2.25 sil	19.50
High phosphorus	19.50
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	22.26
Low phos., sil. 1 to 2, copper free	$29.00 to 29.50
Silvery, sil. 8 per cent	29.79
Bess. ferrosilicon, 14-15%	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Many contracts for 50 per cent ferrosilicon for 1928 have been closed, and some users are placing orders for next year's requirements of ferromanganese. One contract for ferromanganese is for 2500 tons. Spiegeleisen is quiet.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $40.76.

Plates.—It is reported here that the Missouri Pacific has definitely entered the market for 3000 freight cars, requiring close to 45,000 tons of plates, shapes and bars. The Rock Island, following closely on its inquiry for 2750 freight cars, is now in the market for 15 70-ft. suburban cars and the trade believes that this number will be increased before orders are placed. Among purchases this week are 300 refrigerators ordered from the Pullman Car & Mfg. Corporation by the Northern Refrigerator Co. The Chicago & North Western has inquired for 400 gondolas and will come out for additional cars in a few days. Chicago producers have taken orders for 5500 tons of plates for oil storage tank construction in the Southwest and 6000 tons is on inquiry from that section of the country. Plate mills are well engaged on miscellaneous orders and the needs of structural shops. Deliveries range from three to four weeks.

Mill prices on plates, per lb.: 2c. to 2.10c. base Chicago.

Bars.—Demand for mild steel bars is steady and deliveries range from four to six weeks. Forgers in the Chicago district are operating at close to capacity. The lessened demand from manufacturers of automobiles has been offset by an expansion of uses in other directions, notably builders of heavy machinery and machine tools. Owing to the character of this heavier work, some shops are finding that output is at the rate of 120 per cent of capacity as gaged by normal production when turning out automobile parts. Automobile schedules now made out for 30 days indicate a uniform demand for bars from that source. Mild steel bar prices are steady at 2c. to 2.10c. per lb., Chicago. No change is reported in the iron bar market, in which prices are steady at 2c. to 2.10c., Chicago. A fair volume of spot buying in alloy bars is noted and specifications are such that local mills are shipping at a rate close to 85 per cent of capacity. Expansion of miscellaneous uses has in part offset the drop in demand from manufacturers of automobiles. Specifications for rail steel bars are lighter as the month comes to a close. Total shipments, however, in October compare favorably with the best month this year. Orders for fence posts are light because buyers are awaiting the announcement of spring terms on Nov. 6.

Mill prices per lb.: Soft steel bars, 2c. to 2.10c., base, Chicago; common bar iron, 2c. to 2.10c., base, Chicago; rail steel bars, 1.95c., base, Chicago Heights mill.

Cast Iron Pipe.—The Chicago cast iron pipe market continues to mark time. A sprinkling of car lot orders are being placed from day to day, and on that kind of business prices are steady at $36 to $37, Birmingham, or $44.20 to $45.20, delivered Chicago, for diameters 6 in. and larger. Akron, Ohio, will receive tenders on 500 tons of 12 and 16-in. pipe. Shipments against old orders continue heavy, as contractors face cold weather in a few weeks. Several contractors' jobs which sellers had expected would develop are still in the formative stage, with the outlook unfavorable for orders because of the nearness of winter weather. Deliveries are prompt on all common sizes.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $44.20 to $45.20; 4-in., $48.20 to $49.20; Class A and gas pipe, $4 extra.

Structural Material. — Structural shops in this district are well engaged, and specifications issued by them are for liberal quantities of steel. The new Chicago Postoffice is brought a step nearer by the announcement that a local firm of architects will prepare the plans. A bridge at Duluth requiring about 2000 tons will be readvertised, according to advices received here. The American Bridge Co. was low bidder on the first figures taken, but bids for the complete structure are said to have overrun the money available.

Mill prices on plain material, per lb.: 2c. to 2.10c. base, Chicago.

Wire Products.—Specifications from the manufacturing trade are holding to the level of the past few weeks. Automobile builders are taking smaller quantities, partly because this is the season when demand for motor cars slackens and partly because several of the largest makers are changing models. Several automobile plants expect to resume heavier operations about the middle of November. Lighter shipments to automobile centers are partly offset by increased demand from a wide circle of scattered industries. In fact, the net loss in deliveries to the manufacturing trade is not discouraging to sellers. The jobbing trade presents a different picture; the expected increase in fall trade has not come. Especially disappointing has been the scarcity of woven wire fencing orders; normally, this is an active season for this commodity. Orders for nails are few in number and usually of small size, supporting output not above 20 per cent of capacity. Business in the South

shows little change, while orders from the Northwest are in smaller total tonnage. Wire mill output is steady at 65 per cent of capacity.

Rails and Track Supplies.—The Pennsylvania Railroad has distributed orders for 159,600 tons of standard-section rails as follows: 46,900 tons to Carnegie Steel Co., 31,300 tons to Illinois Steel Co., 71,900 to Bethlehem Steel Co., and 9500 tons to Inland Steel Co. Other purchases include 50,000 tons ordered for 1929 shipment to a Western railroad and several miscellaneous lots for immediate delivery. Scattered orders for nearby shipment and small releases against 1929 contracts are holding Chicago rail mills at an output that averages not far from 50 per cent of capacity. Several railroads have ordered a total of 3000 tons of track supplies for shipment this year. Fresh inquiry for future delivery totals 62,000 tons, including 50,000 tons for the Chicago, Milwaukee, St. Paul & Pacific. It is reported that the Illinois Central, the Chicago & North Western and the Burlington will soon follow with inquiries for tonnages approximately equal to their 1927 purchases.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Reinforcing Bars.—Moderate activity again marks the reinforcing bar market. Shop operations are spotty, some being as low as 50 per cent of capacity. Some shops are experiencing trouble in getting mill shipments satisfactory for their delivery schedules. Shipments are pointing downward and this, combined with the approach of winter, is making sellers anxious for work. The result is a further softening of prices on all quotations except those for small tonnages. Recent orders have been taken for rail-steel reinforcing bars at 1.85c., Chicago warehouse, and on attractive tonnages 2.10c. a lb. is not uncommon for the billet bar commodity. It is reported that a round tonnage will be needed for a plant addition to the Stewart Warner Speedometer Corporation, Chicago.

Coke.—Chicago delivered prices are firm at $8.75 and oven quotations are $8. Shipments to foundries are heavy.

Old Material.—Dealers are asking $15 a gross ton, delivered, for heavy melting steel. Brokers' trades range from $14.75 to $15 a ton. On the whole, this market is strong except in steel axles, the supply of which is far ahead of demand. Cast iron borings have gone up 50c. a ton on sales totaling more than 5000 tons. Sellers are asking higher prices for railroad malleable, which is scarce. Cast iron wheels are in active demand in small lots and readily bring 50c. a ton more than last week. Stocks in the hands of large users are of moderate size in spite of the volume of recent shipments, which in some cases have overtaxed unloading facilities at local plants. The St. Paul is offering 5000 tons of rerolling rails and the Burlington will dispose of 4700 tons of miscellaneous scrap.

Prices deliv'd Chicago district consumers:

	Per Gross Ton	
Basic Open-Hearth Grades:		
Heavy melting steel	$14.50 to	$15.00
Shoveling steel	14.50 to	15.00
Frogs, switches and guards, cut apart, and misc. rails	15.50 to	16.00
Hydraul. compressed sheets	12.50 to	13.00
Drop forge flashings	10.00 to	10.50
Forg'd, cast and r'l'd steel carwheels	17.25 to	17.75
Railr'd tires, charg. box size	17.25 to	17.75
Railr'd leaf spring cut apart	17.25 to	17.75
Acid Open-Hearth Grades:		
Steel couplers and knuckles	16.00 to	16.50
Coil springs	18.25 to	18.75
Electric Furnace Grades:		
Axle turnings	14.00 to	14.50
Low phos. punchings	16.00 to	16.50
Low phos. plate, 12 in. and under	15.50 to	16.00
Blast Furnace Grades:		
Axle turnings	11.50 to	12.00
Cast iron borings	11.50 to	12.00
Short shoveling turnings	11.50 to	12.00
Machine shop turnings	7.25 to	7.75
Rolling Mill Grades:		
Iron rails	14.75 to	15.25
Rerolling rails	16.50 to	17.00
Cupola Grades:		
Steel rails less than 3 ft.	17.50 to	18.00
Angle bars, steel	16.50 to	17.00
Cast iron carwheels	14.25 to	14.50
Malleable Grades:		
Railroad	15.75 to	16.25
Agricultural	12.50 to	13.00
Miscellaneous:		
*Relaying rails, 56 to 60 lb.	23.00 to	25.00
*Relaying rails, 65 lb. and heav.	26.00 to	31.00
	Per Net Ton	
Rolling Mill Grades:		
Iron angles and splice bars	14.50 to	15.00
Iron arch bars and transoms	20.50 to	21.00
Iron car axles	25.50 to	26.00
Steel car axles	15.50 to	16.00
No. 1 railroad wrought	12.75 to	13.25
No. 2 railroad wrought	13.00 to	13.50
No. 1 busheling	11.00 to	11.50
No. 2 busheling	6.00 to	6.50
Locomotive tires, smooth	13.00 to	13.50
Pipes and flues	9.50 to	10.00
Cupola Grades:		
No. 1 machinery cast	15.50 to	16.00
No. 1 railroad cast	14.50 to	15.00
No. 1 agricultural cast	14.00 to	14.50
Stove plate	11.75 to	12.25
Grate bars	12.50 to	13.00
Brake shoes	11.75 to	12.25

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Sheets.—Prices for these commodities remain strong, and there is still talk among the trade of an advance. Specifications are fully equal to shipments, which represent close to 85 per cent of hot mill capacity. Deliveries to the roofing trade are light, but improvement in this situation is looked for in November, when roofing materials are used in greater quantities in the South. New buying is in small volume and backlogs are steadily being reduced. Many buyers have specified close to their full contract obligations and sellers believe that a round tonnage will be needed to fill out the fourth quarter. Sheets are moving rapidly through jobbers' hands, as shown by shipments from mills to that trade. Agricultural implement manufacturers are using large quantities of sheets, and their specifications against contracts that have been placed in the last 30 days are heavy.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.90c.; No. 24 galv., 3.65c.; No. 10 blue ann'l'd, 2.15c. Deliv'd prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Bolts, Nuts and Rivets.—Specifications are measurably heavier. Producers, especially those who furnish bolts, nuts and rivets to manufacturers of agricultural machinery, find that operations at 65 per cent of capacity match closely with shipments. Output for the industry averages well over 60 per cent, and some producers have expanded to 70 per cent of capacity. Prices are firm for all commodities.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.10c. to 2.50c.
Reinforc'g bars, rail steel	1.85c. to 2.40c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.80c.
Galv. sheets (No. 24)	4.65c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, stand. railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.30
Com. wire nails, base per keg	3.10
Cement c't'd nails, base per keg	3.10

Industrial Power Plant for 1800 Lb. Steam Pressure

A boiler and power plant designed for 1800 lb. steam pressure is to be erected for the Philip Carey Mfg. Co., Cincinnati, manufacturer of asbestos and magnesia high-pressure steam pipe insulation., at its Lockland, Ohio, works. W. E. S. Dyer, consulting engineer, Philadelphia, will design and have charge of the construction. The high-pressure steam generating equipment will be furnished by Combustion Engineering Corporation, New York. Integral economizers, water-cooled furnace walls, air preheaters, superheaters and pulverized fuel equipment will comprise the units.

The main generating units will consist of two 5000-hp. vertical triple expansion, direct connected engines, operating with 1400 lb. pressure at the throttle, at a temperature of 800 deg. Fahr., and exhausting against 60 lb. back pressure above the atmosphere. To each engine will be direct connected a three-phase alternator. All the equipment for this plant will be placed with American manufacturers, except the main engines, which will be furnished by A. Borsig, Berlin, Germany. The operating cycle of this plant is expected to make it one of the most efficient steam plants in the world.

Philadelphia

Pennsylvania Railroad Orders 159,600 Tons of Rails—10,000 Ton Sale of Basic Pig Iron at $20, Delivered

PHILADELPHIA, Oct. 30.—Steel deliveries are becoming less extended, most mills offering shipments in 10 days to two weeks, compared with two and three weeks or more early in the month. The past week has brought a slight lull in buying, but shipments on contracts continue in good volume. Bar mills are still heavily booked ahead and in a slightly stronger position on tonnage than the plate, structural or sheet mills. Plate prices show some irregularity, depending upon the position of the individual producer, so that prices range from 2.05c. to 2.15c., Coatesville. Black sheets still show occasional concessions of $1 a ton from 2.75c., Pittsburgh. The Pennsylvania Railroad has placed its 1929 rail requirements, totaling 159,600 tons, of which 71,900 tons went to the Bethlehem Steel Co., 9500 tons to the Inland Steel Co., and 78,200 tons to Steel Corporation mills. Some sizable plate buying is in prospect by shipyards, which are bidding for contracts or have received awards for new ship construction.

Pig Iron.—Quotations on foundry iron are still from $20 to $20.50 per ton, furnace, for delivery to the end of this year and $20.50 per ton, minimum, for first quarter shipment. Some small contracts for the next quarter are reported and a moderate volume of inquiry. Low phosphorus demand continues good, and prices are strong but unchanged. Basic iron shows a further advance on a sale of 10,000 tons at $20 per ton, delivered. The Coatesville user of basic, inquiring for about 20,000 tons, has not yet bought.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$20.76 to $21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.26 to 21.76
East. Pa. No. 1X	21.76 to 22.26
Basic (del'd east. Pa.)	19.75 to 20.00
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.00 to 23.50
Va. No. 2 plain, 1.75 to 2.25 sil.	24.54
Va. No. 2X, 2.25 to 2.75 sil.	25.04

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Ferromanganese. — Domestic and British producers have opened their books for next year and the domestic makers report a substantial tonnage booked at $105 per ton, seaboard, quoted for delivery throughout the year. British makers have not yet closed many contracts, although they have announced $105 per ton, seaboard, as the 1929 price.

Bars.—Deliveries are slightly less extended than a few weeks ago, but still range from 10 days to about three weeks, depending upon the sizes specified. Bar mills are generally in a stronger position on tonnage than plate, shape or sheet producers, and no concessions from 1.95c. to 2c., Pittsburgh, or 2.27c. to 2.32c., Philadelphia, are reported on new business.

Shapes.—Quotations are on a basis of mill nearest to consumer, so that there is considerable absorption of freight rates in some instances. On most business the shape market continues at 2.05c., f.o.b. mill, or 2.11c. per lb., delivered Philadelphia, based on 2.05c., Pencoyd. Fabricators are well filled with tonnage and some desirable projects are pending. The New York Shipbuilding & Dry Dock Co., Camden, N. J., has received the contract for a Grace Line vessel, which will probably require 1200 to 1300 tons of shapes.

Plates.—Although most mills are well booked, 2.15c., Coatesville, or 2.25c., Philadelphia, is not yet the minimum on new business. Preferred buyers are still able to obtain 2.10c., Coatesville, and occasionally there are transactions at 2.05c., Coatesville, or 2.15c., Philadelphia. Mills are offering slightly earlier delivery than a few weeks ago, shipments ranging from 10 days to two weeks. Some substantial plate tonnage is in prospect for shipbuilding, a Grace Line ship let to the New York Shipbuilding & Dry Dock Co., Camden, requiring about 3700 tons, and four vessels for the American Express Lines, which are still pending, about 13,500 tons. The fabricated pipe line at Lardner's Point may bring 6000 to 7000 tons of plates to an eastern Pennsylvania mill, if the contract for fabrication goes to a company in the East.

Sheets.—Except for continued reports of concessions of $1 a ton to preferred buyers of black sheets, the market continues at 2.75c., Pittsburgh, or 3.07c., Philadelphia. Galvanized sheets are unchanged at 3.50c., Pittsburgh, or 3.82c., Philadelphia, and blue annealed are quoted at 2c. and 2.10c., Pittsburgh, or 2.32c. and 2.42c., Philadelphia. Continuous mill sheets are still quoted at about 1.90c., Pittsburgh. New orders for sheets are small, and mill deliveries have receded to about two weeks or less compared with three to five weeks quoted at the beginning of the month.

Warehouse Business.—October purchases from stock have been slightly larger than those of September, but the month does not rank with the largest of the year. Prices are firm, and black and galvanized sheets are stronger, although small concessions are still evident, usually based on failure to quote the higher base price intended for small lots.

Imports.—In the week ended Oct. 27, 503 tons of pig iron arrived at this port from British India, 1401 tons of manganese ore from Chile, 750 tons of chrome ore from India and 30 tons of ferromanganese from the United Kingdom. Steel arrivals consisted of 106 tons of steel bars, 16 tons of shapes and 5 tons of steel bands from France, 709 tons of shapes, 9 tons of steel bars and 6 tons of bands from Belgium and 15 tons of strip steel from the United Kingdom.

Old Material.—Prices no longer show the strong undertone evident for some weeks, and brokers who are filling contracts report a good supply of certain grades at slightly lower buying prices. A dealer who is buying agent for a Phoenixville consumer has reduced his offers 25c. a ton and is quoting $11.50 per ton for machine shop turnings, $13 per ton, delivered, for yard grade of heavy melting steel and $12.50 per ton, delivered, for stove plate. A sale of No. 1 cast scrap has been made at $18 per ton, delivered, but it is understood to have been on a high freight rate. Chemical borings have brought $16 per ton on a recent sale and No. 1 railroad wrought shows an advance of 50c. a ton to $16.50 per ton on deliveries to a Lebanon, Pa., consumer.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$16.00 to $16.50
Scrap T rails	15.50 to 16.00
No. 2 heavy melting steel	13.00 to 13.50
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.50 to 12.00
Machine shop turnings (for steel works)	11.50 to 12.00
Heavy axle turnings (or equiv.)	12.50 to 13.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	16.50 to 17.00
Railroad grate bars	13.00 to 13.50
Stove plate (for steel works)	13.00
No. 1 low phos., hvy., 0.04% and under	19.00 to 20.00
Couplers and knuckles	17.50 to 18.00
Rolled steel wheels	17.00 to 17.50
No. 1 blast f'nace scrap	10.00 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00 to 15.50
Shafting	19.00 to 20.00
Steel axles	22.00 to 23.00
No. 1 forge fire	12.50 to 13.00
Cast iron carwheels	16.50 to 17.00
No. 1 cast	17.50
Cast borings (for chem. plant)	15.00 to 16.00
Steel rails for rolling	15.50 to 16.00

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.45c.
Cold-fin. steel, sq. and flats	3.95c.
Steel hoops	3.60c.
Steel bands, No. 12 to ⅛-in., inclus.	3.35c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.85c.
†Galvanized sheets (No. 24)	4.60c.
Blue ann'l'd sheets (No. 10)	3.00c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

New York

Large Car-Building Program in Prospect—Pig Iron Advance by Buffalo Furnaces Stimulates Sales

NEW YORK, Oct. 30.—Spot demand for pig iron remains active, indicating that melters rather generally are in need of supplementary tonnage. Sales in this territory for the week, which totaled more than 13,000 tons, were stimulated to some extent by a general advance of 50c. a ton to $17.50, base Buffalo, on foundry iron for both current and first quarter deliveries. Politics, which has been without noticeable effect on business, is commencing to influence the attitude of buyers as election day draws near. While there is considerable interest in pig iron requirements for the first quarter, very little has been bought for that period, and it is evident that users are postponing action until election results are known. The Eastern Malleable Iron Co. has closed for 1500 tons of malleable, to be distributed among its plants at Naugatuck and Union City, Conn., Troy, N. Y., and Wilmington, Del. Low phosphorus pig iron is more active than for some time in both sales and inquiries. The Richardson & Boynton Co. has closed for a round tonnage of foundry iron for its Utica, N. Y., plant. The Foran Foundry & Mfg. Co., Flemington, N. J., is in the market for 1000 tons for November-December shipment. Abendroth Brothers, Port Chester, N. Y., are inquiring for 250 tons each of No. 2X and No. 1X for early delivery. An advance in the ocean freight rate on pig iron from Europe, effective Jan. 1, is expected to be announced next week. An increase of about $1.25 in the ocean rate from India, effective on the same date, was recently made public. Importers have sold virtually their entire allotment of Indian iron for deliveries until about March 1, when the last shipments leaving the Orient prior to Jan. 1 will reach this country.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41
*Buf. No. 2, del'd east. N. J.	20.78
No. 2, del'd east. N. J. tidewater	$20.01 to 21.89
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	21.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.89 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	22.39 to 23.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Plates, Shapes and Bars.—Definite assurance has been given to railroad car building companies by a number of railroads that they will come into the market before Jan. 1 or early in 1929 for large quantities of freight cars. It is estimated that inquiries for 40,000 to 50,000 cars are in sight, with the probability that more than half of these will be bought before the end of the year. Considering that the total number ordered in the first nine months of the year did not exceed 30,000, including about 5000 to be built in railroad companies' own shops, the present prospect is the most impressive that car builders have faced in more than a year. Car purchases so far in 1928 are the smallest since the war, excepting 1921, when only 23,000 cars were ordered. The peak year since the war was 1922, with orders for about 180,000 cars. It is known that some railroads have their lists ready to submit to car builders for bids, but are awaiting the result of the national election. Three roads are mentioned as about to inquire for upward of 5000 cars each, another has a schedule of 4500 and several will inquire for lots ranging from 1000 to 3000. Local steel company offices report that specifications against contracts in October have held up at a high rate, but new business has declined. The total of specifications and new orders in the month has fallen somewhat behind the September figure. Prospects continue promising for large awards of structural steel. Not less than 15,000 tons in apartment house projects may soon be closed, having been held up pending the outcome of an appeal to the city administration for a change in the building code permitting the use of lighter sections for certain stresses. This appeal was denied. A leading fabricator has been awarded 11,300 tons of fabricated steel work for the New York subways. Steel bar prices are firmer at 1.95c. to 2c., Pittsburgh, 1.90c. having disappeared except to a few large contract buyers. Plates and structural shapes have not shown the strength of bars. The common prices on plates are 2.22½c. and 2.27½c., New York, while on shapes 2.19½c., New York, is quoted to large buyers, smaller buyers paying $1 or $2 a ton higher.

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.50c.
Flats and squares	4.00c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue ann'l'd sheets (No. 10)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.60c. to 5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.
	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 16 in. and smaller	50 to 50 and 10
	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discount on Welded Pipe

Standard Steel—	Black	Galv.
⅛-in. butt	46	29
¼-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
⅛-in. butt	5	+19
¼-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.60c. to 3.80c.
No. 22	3.75c. to 3.95c.
No. 24	3.80c. to 4.00c.
No. 26	3.90c. to 4.10c.
No. 28*	4.05c. to 4.25c.
No. 30	4.30c. to 4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.15c. to 4.35c.
No. 16	4.00c. to 4.20c.
No. 18	4.15c. to 4.35c.
No. 20	4.30c. to 4.50c.
No. 22	4.35c. to 4.55c.
No. 24	4.50c. to 4.70c.
No. 26	4.75c. to 4.95c.
No. 28*	5.00c. to 5.20c.
No. 30	5.40c. to 5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.29c. to 2.34c.; plates, 2.22½c. to 2.27½c.; struc. shapes, 2.19½c. to 2.22½c.; bar iron, 2.14c. to 2.24c.

Ferroalloys. — Announcement has been made by practically all sellers of ferromanganese that their books are open for 1929 at the unchanged quotation of $105, seaboard basis. Some contracts have been made for next year, but this has not been general. Quotations for 1929 for 50 per cent ferrosilicon will also be unchanged at $83.50 per ton, delivered, on contract and at $88.50 for orders not covered by contract. There will be no change in next year's quotations for standard ferrochromium containing 65 to 70 per cent chromium and 4 to 6 per cent carbon, namely, 11c. per lb. of contained chromium. Business in spiegeleisen is confined to small lots; no announcement of 1929 prices has been made.

Cast Iron Pipe.—Seasonal quiet has set in, and current buying is limited to carload lots or less to complete pipe installations. Southern pipe makers continue to quote prices considerably higher than the bids of Northern foundries, but the latter have recently been advancing quotations. The low bid on 14,000 tons of pipe for Warwick, R. I., not yet awarded, is understood to have been $36.40 per net ton on the 6-in. pipe, quoted by the Herbert Kennedy Co., New York, agent for the French maker. The lowest bid of an American maker on the 6-in. was $43.50 per ton, delivered, submitted by the Warren Foundry & Pipe Co. The low bid on 1300 tons of water pipe for Herkimer, N. Y., was

submitted by the United States Cast Iron Pipe & Foundry Co.

Prices per net ton, deliv'd New York: Water pipe, 6-in. and larger, $35.60 to $36.60; 4-in. and 5-in., $40.60 to $41.60; 3-in., $50.60 to $51.60; Class A and gas pipe, $4 to $5 extra.

Fluorspar.—Domestic users of foreign fluorspar have covered as heavily as possible against material already in this country or due to arrive before Nov. 19, when the increase in duty goes into effect. Some purchases were made at as low as $15 per net ton, duty paid, but it is reported that this price was made on off-grade material and that standard spar brought $16 in most instances. It will probably be some time before the market on foreign spar is again tested, but it is assumed that delivered prices will reflect the higher duty, at least in part.

Reinforcing Bars.—This market has been rather quiet in the last week. The tonnage booked was mostly in small lots. General contractors' bids will close tomorrow on the Delaware, Lackawanna & Western Railroad terminal warehouse at Jersey City, requiring about 8500 tons. Among the new projects announced is a bridge at East 238th Street, New York, which will take 250 tons, and a building in Manhattan for the Interborough News Co., for which the tonnage is being estimated. Prices are unchanged.

Warehouse Business. — The past month has been better than September with most jobbers, and in some cases warehouses report the largest month's business of the year. Demand for structural steel and bars continues large despite the advanced season. Black and galvanized sheets also are fairly active. While small concessions are still reported on sheets, prices are firmer than for several months.

Coke. — Standard furnace coke is firm at $2.85 to $3.05 per net ton, Connellsville, and foundry coke is unchanged at $3.50 to $3.75 per net ton, Connellsville. Standard brands remain at $4.85 per net ton, ovens, or $8.56 per net ton, delivered to northern New Jersey, Jersey City and Newark, and $9.44 per ton to New York and Brooklyn. By-product foundry coke prices are $9 to $9.40, Newark or Jersey City, and $10.06, New York or Brooklyn.

Old Material. — Buying prices of brokers are beginning to show irregularity, recent sales of some grades justifying advances, while offers on other grades are slightly lower. Heavy breakable cast is being bought at $16 per ton, delivered to a Harrisburg consumer, with a $3.78 per ton freight rate from New York, and at $16 per ton, delivered to a Florence, N. J., foundry, with a $2.90 freight rate. No. 1 railroad wrought has been bought by a broker at $16.50 per ton, delivered Lebanon, Pa. Foundry grade stove plate is going to a consumer at West Mahwah, N. J., at $12 per ton, delivered. No. 1 heavy melting steel is unchanged, but despite slight weakness in the Pittsburgh district, which might affect the eastern Pennsylvania market, it is pointed out that on a special list of the Pennsylvania Railroad, on which bids were opened last week, the heavy melting steel brought $19.05 and $18.50 per ton, Youngstown, on about 2000 tons. The monthly list of the Pennsylvania totaling about 40,000 tons is offered this week.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$12.00 to $12.50
Heavy melting steel (yard)	8.75 to 9.50
No. 1 hvy. breakable cast.	12.25 to 13.00
Stove plate (steel works).	8.75 to 9.00
Locomotive grate bars....	9.25 to 10.25
Machine shop turnings....	8.00 to 8.50
Short shoveling turnings..	8.00 to 8.50
Cast borings (blast furn. or steel works).....	7.00 to 7.50
Mixed borings and turnings	7.00 to 7.50
Steel car axles.....	18.00 to 18.50
Iron car axles.....	25.25 to 26.25
Iron and steel pipe (1 in. dia., not under 2 ft. long)	11.25
Forge fire.....	8.50 to 9.00
No. 1 railroad wrought...	12.25 to 12.75
No. 1 yard wrot. long....	11.25 to 11.75
Rails for rolling.....	12.50 to 13.50
Cast iron carwheels.....	13.00 to 13.50
Stove plate (foundry).....	10.00
Malleable cast (railroad)..	10.00 to 10.50
Cast borings (chemical)..	11.25

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	$17.00 to $17.50
No. 1 hvy. cast (columns, bldg. materials, etc.) cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.).....	14.50 to 15.00

Cleveland

Pressure for Steel Deliveries Becomes More Insistent—Pig Iron Sales Made for First Quarter

CLEVELAND, Oct. 30.—Pressure for deliveries became the predominating feature of the local steel market during the week, this being particularly true of bar products. There has been an increase in inquiries for lots from a carload to 100 tons from consumers who evidently have about used up their stocks of certain sizes and want quick shipments against new specifications. Price has ceased to be an outstanding factor. With the recent falling off in specifications, the volume of business in this territory during October will be somewhat below that of September, and, while reports do not indicate that deliveries have improved, mills are making heavy inroads into their orders, and some will be able to make better shipments shortly.

Demand for steel from the automotive industry has decreased somewhat because of the seasonal decline in that industry, although it is still operating at greater capacity than is usual at this time of the year. The Chevrolet Motor Car Co., which was expected to order a large tonnage of steel this month, evidently will not get in production on its new models as soon as planned and this has resulted in withholding orders for steel. Large orders for Chevrolet parts have been placed with stamping and other parts makers, but releases against these orders are slow in coming out.

Inquiry in the structural field is light. An export inquiry from Japan for 2500 tons of structural material for cargo handling equipment to be erected at Dairen, Manchuria, is being figured on by a Cleveland fabricator.

Prices are firm at 1.95c., Pittsburgh, for steel bars, plates and structural material. The Cleveland base price for steel bars ranges from 1.90c. to 2.05c.

Pig Iron.—A fairly active buying movement is under way for the first quarter in some sections served by Cleveland interests, although foundries in the Cleveland district are not yet showing much interest in iron for that delivery. Producers with headquarters in Cleveland sold 42,000 tons in foundry and malleable iron the past week, compared with 38,000 tons the previous week. About 75 per cent of this business was for the first quarter. A few inquiries have come out for the first half, but furnaces are declining to quote beyond the quarter. Another inquiry for basic iron has come in the market, this being for 5000 tons from a north central Ohio consumer. Two basic inquiries totaling 20,000 tons or more, previously reported, are apparently still pending. Prices on foundry and malleable iron are firm at the recent advance to $18, Cleveland, for outside shipment, with one Lake furnace holding to $18.50 for western and central Ohio and Indiana delivery. In Michigan, $19 is the ruling price. Business taken during the week was at the advanced prices. In the Valley district, the foundry iron market appears to be holding more firmly to $17.50. The only price change reported during the week is a 50c. advance in Buffalo, where foundry and malleable iron are now quoted at $18.50 and $19 respectively. October shipments will show some gain over September, which was a heavy month in shipments. Furnace stocks have been reduced considerably this month.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.00
S'th'n fdy., sil. 1.75 to 2.25	22.25
Malleable	19.00
Ohio silvery, 8 per cent...	28.00
Basic Valley furnace.....	$17.00 to 17.50
Stand. low phos., V'ley fur.	26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Iron Ore.—Ore shipments are going along at a heavy rate and the movement by water in October will amount to 8,200,000 tons, or more than 1,500,000 tons gain over the corresponding period last year. With the recent increase in shipping orders, the season's movement is expected to run considerably above that of last year, when total shipments by rail and lake were 52,343,336 tons. There has been some additional chartering of vessels to handle ore.

Semi-Finished Steel.—Specifications for sheet bars and slabs continue heavy. Some of the consumers are anxious to accumulate stocks, but are unable to do so, as deliveries are rather slow. There is very little new inquiry, as practically all buyers are covered for the remainder of the year.

Sheets.—A fair amount of new business is coming out in this territory, but there has been a slowing down in specifications from the automotive industry, and in some cases shipments to that industry are being deferred. The Chevrolet Motor Car Co. has purchased a heavy tonnage of auto body sheets for its new models, which were expected to come out Nov. 1, but it is stated that a Cleveland plant that will manufacture the bodies will not start taking shipments in good volume until late in November. Most mills are three to six weeks behind on deliveries. The bulk of the new business is being taken at regular prices, although some price shading is still in evidence.

Strip Steel.—Mills continue to get specifications against contracts for hot-rolled strip. One or two mills during the week adopted the new card of extras and a 2c., Pittsburgh, price for 6-in. and narrower material and 1.90c. for wider material. There is not much new business. Cold-rolled strip is moving well. Some of the mills are still quoting this product at 2.75c., Cleveland and Pittsburgh, for good lots, while others are asking 2.85c.

Wire Products.—Wire is moving well to the manufacturing trade, but nails are quiet. Shading to $2.45 per keg on nails is still reported in some sections, although leading producers are not making concessions.

Warehouse Business. — October sales show a fair gain over those of September, as deferred mill deliveries are proving a help to warehouse business. The demand for sheets has declined. Prices are firm.

Reinforcing Bars.—Work involving a fair tonnage is still pending, but new inquiry is light. Warehouses are holding closely to 2.25c. Pittsburgh, for cut lengths, but are able to get only small lots at that price. Rail steel bars are quoted at 1.85c., mill.

Coke.—There is only a moderate amount of activity in foundry coke, as most consumers are under contract. Prices are unchanged at $3.75 to $4.85 for standard Connellsville brands and $7.75, Painesville, for Ohio by-product coke, the latter price being for November shipment. Domestic coke continues active.

Old Material.—The local market continues very firm and prices are higher on heavy melting steel and machine shop turnings. However, Pittsburgh dealers are not offering local dealers as high prices as they were paying a week ago. Prices in Cleveland have not advanced as much as in the Pittsburgh and Valley districts, and local dealers have found it necessary to mark their prices up further to obtain scrap for shipment to Cleveland mills. Dealers now are paying up to $14.75 for ordinary No. 1 heavy melting steel and $14 for No. 2 and as high as $10 for machine shop turnings. Youngstown district mills are understood to have made some scrap purchases. Dealers claim that $17.50 is the best they can get from mills for No. 1 heavy melting steel for that district. November lists issued by the Michigan automobile companies include 4400 tons from Dodge Brothers and 4500 tons from the Buick plant.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex	3.65c.
Cold-fin. flats and sq	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.50c.
Galvanized sheets (No. 24)	4.25c.
Blue ann'l'd sheets (No. 10)	3.35c.
No. 9 ann'l'd wire, per 100 lb	$2.85
No. 9 gal. wire, per 100 lb	3.30
Com. wire nails, base per keg	2.85

*Net base, including boxing and cutting to length.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.50 to $15.00
No. 2 heavy melting steel	13.50 to 14.00
Compressed sheet steel	13.50 to 14.00
Light bundled sheet stamp'gs	11.50 to 11.75
Drop forge flashings	12.25 to 12.75
Machine shop turnings	9.50 to 10.00
No. 1 railroad wrought	12.75 to 13.00
No. 2 railroad wrought	14.50 to 15.00
No. 1 busheling	13.00 to 13.25
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phos. forging crops	16.00 to 16.50
Low phos., billet, bloom and slab crops	17.00 to 17.50
Low phos. sheet bar crops	16.50 to 17.00
Low phos. plate scrap	15.50 to 16.00
Blast Furnace Grades	
Cast iron borings	10.50 to 10.75
Mixed bor'gs and short turn'gs	10.50 to 10.75
No. 2 busheling	10.50 to 10.75
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	16.75 to 17.25
Miscellaneous	
Railroad malleable	16.00 to 16.50
Rails for rolling	16.25 to 16.50

Reinforcing Steel

Two New Projects Call for 2000 Tons Each

WITH an office building at Boston calling for 2000 tons and highway work in Tennessee requiring a similar tonnage, new projects reported to THE IRON AGE in the last week totaled 6225 tons. The following awards of 4650 tons include 1000 tons for an apartment building at Chicago:

WHITE PLAINS, N. Y., 155 tons, garage, to McClintic-Marshall Co.

NEW YORK, 110 tons, warehouse on East Thirty-sixth Street for New York Steam Corporation, to Jones & Laughlin Steel Corporation.

NEW YORK, 100 tons, ash dump at foot of East Seventy-third Street, to Tidewater Structural Materials Corporation.

ASBURY PARK, N. J., 300 tons, convention hall, to Jones & Laughlin Steel Corporation.

WASHINGTON, 500 tons, bridge, to Concrete Steel Co.

FORT BRAGG, N. C., 325 tons, barracks buildings, to Connors Steel Co.

OXFORD, MISS., 115 tons, dormitory, to Connors Steel Co.

MEMPHIS, TENN., 100 tons, National Bank of Commerce building, to Laclede Steel Co.

EVANSTON, ILL., 250 tons of rail steel bars. Young Men's Christian Association Building, to Inland Steel Co.

CHICAGO, 1000 tons of rail steel bars, apartment building at 1420 Lake Shore Drive, to Calumet Steel Co.

CHICAGO, 400 tons of rail steel bars, apartment building at Seventy-second Street and South Shore Drive, to Joseph T. Ryerson & Sons.

CHICAGO, 400 tons, apartment building, awarded by A. & E. Anderson to Kalman Steel Co.

STATE OF ILLINOIS, 100 tons of rail steel bars, road work, to American System of Reinforcing.

EAST CHICAGO, ILL., 800 tons of rail steel bars, buildings for United States Gypsum Co., to Calumet Steel Co.

SACRAMENTO, CAL., 395 tons, highway work in Sonoma County, to Pacific Coast Steel Co.

SAN FRANCISCO, 675 tons, Sears-Roebuck warehouse, to Soule Steel Co.

LOS ANGELES, 164 tons, Rubio Wash Storm Drain, to Blue Diamond Co.

HOQUIAM, WASH., 100 tons, City Hall, to Northwestern Steel Rolling Mills.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BOSTON, 2000 tons, United Shoe Machinery Corporation office building.

NEW YORK, 250 tons, East 238th Street bridge, Corbetta Concrete Corporation, low bidder on general contract.

NEW YORK, tonnage being estimated, building for Interborough News Co.; Russell G. Corey, architect.

CLEVELAND, 150 tons, addition to Hanna garage.

CINCINNATI, 300 tons, Heberle School, general contract awarded to Penker Construction Co.

NASHVILLE, TENN., 2000 tons, highway projects for State Highway Commission.

CHICAGO, 250 tons, apartment building on Commonwealth Avenue; H. B. Ryan, architect.

CHICAGO, tonnage being estimated, plant addition for Stewart-Warner Speedometer Corporation.

MILWAUKEE, 900 tons, addition to Catholic institution.

WALLA WALLA, WASH., 100 tons, Veterans' Hospital; bids opened.

SACRAMENTO, 127 tons, highway work in San Luis Obispo County; bids Nov. 14.

LOS ANGELES, 145 tons, laundry, South San Pedro Street; bids being taken.

The Superior Steel Corporation, Carnegie, Pa., will start operation in the next few weeks of a new electrically-driven 8-in., 4-stand horizontal hot strip mill, on which it will roll strips as narrow as ⅝ in. wide up to 3 in. to No. 22 gage. Hitherto, the narrowest strips this company has been able to roll have been 1 in. and then in the heavier gages.

William Jessop & Sons, Ltd., Sheffield, England, steel exporter, has appointed the Pigott Steel Co., 620 Frankfort Avenue, Cleveland, as agent in the Cleveland district.

Pacific Coast

Cast Iron Pipe Market More Active—2000 Tons for Los Angeles Store Largest Structural Award

SAN FRANCISCO, Oct. 27. (*By Air Mail*)—Demand for iron and steel products on the Pacific Coast is holding up fairly well, but most bookings of the week called for relatively small lots. Included among the larger lots were 2000 tons of structural shapes for Bullock's Store, Los Angeles, booked by the Llewellyn Iron Works, and approximately 1600 tons of cast iron pipe, divided between two makers.

Pig Iron.—A slight improvement in the rate of operations among jobbing foundries in northern California is reported. Specialty plants, such as sanitary ware and stove foundries, continue to operate on fairly heavy schedules. Pig iron prices are unchanged. Imports of foundry iron in July totaled 1248 tons, compared with 1441 tons in June and 1050 tons in July, 1927.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	24.00 to 25.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—One of the largest reinforcing bar awards in the San Francisco district during the past month or two went to Soule Steel Co. and called for 675 tons for a warehouse for Sears, Roebuck & Co. The Pacific Coast Steel Co. took 395 tons for highway work in Sonoma County, California. Pending business totals more than 5000 tons, the largest project calling for 1800 tons for the Life Science Building at Berkeley. Prices on out-of-stock material have shown no signs of strengthening, and 1.80c., base, is general both in the Los Angeles and San Francisco districts. Imports of bars, both merchant and reinforcing, during July totaled 3615 tons, compared with 2487 tons for June and 2199 tons for July, 1927.

Plates.—The Beall Tank & Pipe Co. secured the largest award of the week, calling for 230 tons for an 18-in. welded pipe line for the Beebe Orchard Co., Wenatchee, Wash. The Pacific Coast Engineering Co., Oakland, Cal., booked 100 tons for Plummer ball joints for various interests. Bids were opened this week on 231 tons of 24-in. riveted pipe for Seattle, alternate bids being taken on cast iron pipe. The United States Engineer Office, San Francisco, will open bids next week on 185 tons of 20-in. shore pipe. Importations in July totaled less than 250 tons. So far this year 680 tons has been brought in. Prices range from 2.20c. to 2.25c., c.i.f.

Shapes.—Pending business does not exceed 6000 tons. The McClintic-Marshall Co. Central Works is low bidder on 2300 tons for the Methodist Book Concern Building, San Francisco. During July, 1428 tons of foreign material came in at Pacific ports. This compares with 1455 tons for June and 2192 tons for July, 1927. Plain domestic material is firm at 2.35c., c.i.f., while foreign shapes are about 1.60c., c.i.f., duty paid.

Cast Iron Pipe.—The cast iron pipe market was active during the week. Los Angeles placed 866 tons of 12-in. Class 350 pipe with the American Cast Iron Pipe Co. and 720 tons of 6-in. Class 350 with the Pacific States Cast Iron Pipe Co. Various street improvement projects in Seattle, involving 300 tons, went to the United States Cast Iron Pipe & Foundry Co., as did 659 tons of 6 to 24-in. for the Young Street improvement job in Honolulu. Phoenix, Ariz., placed 537 tons of 2 to 12-in. Class B pipe with an unnamed company. E. J. Treacy secured 145 tons for the Franklin Street improvement project in San Francisco, calling for 18-in. Class H pipe. Bids were opened this week on 1284 tons of 24-in. Class B pipe for Seattle, alternate bids being received on riveted steel pipe. H. E. Conner, Redwood City, Cal., was low bidder on 144 tons of 4 and 6-in. Class B pipe for street improvement in Tulare, Cal. In July, 4135 tons of cast iron pipe was imported, compared with 1231 tons in June and 2375 tons in July, 1927.

Steel Pipe.—The largest award of the week involved 300 tons of 4-in. pipe for the Santa Maria Gas Co., Santa Maria, Cal., and was booked by Grinnell Co. Distributers report a better movement from stock. Importations of tubular products, exclusive of cast iron pipe, during July totaled 2157 tons, compared with 2169 tons in June and 4158 tons in July, 1927.

Coke.—Sales and inquiries are limited to unimportant lots for prompt shipment. Imports in July totaled 4659 tons, compared with 4901 tons in June and 3054 tons in July last year. English beehive coke is quoted at $16 a net ton, delivered incoming dock, and English by-product at from $11.50 to $13 a net ton.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ⅞-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	5.00c.
Blue ann'l'd sheets (No. 10)	4.00c.
Galv. sheets (No. 24)	5.40c.
Struc. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100-lb. keg	3.40

Birmingham

Southern Basic Iron Shipped to the Orient—Steel Demand Continues at a Good Rate

BIRMINGHAM, Oct. 30.—In pig iron, this is an in-between buying period, so new sales are light. Estimates by makers as to the amount of fourth quarter iron under contract in the district range from 85 to 95 per cent. Prices are firm at $16.25 for last quarter delivery. No inquiries are being received for first quarter iron. All makers report October shipments larger than those of September. About 4000 tons of basic iron has been exported to the Orient during the last three weeks, shipments being made by barge on the Warrior River. Another shipment for about half this quantity is scheduled for early November. Iron production is steady. Furnace operations have not been changed since the first week of October. Of the 18 in blast, 15 are on foundry, two on basic and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$16.25
No. 1 fdy., 2.25 to 2.75 sil.	16.75
Basic	16.25

Finished Steel.—Owing to the closing of the rail mill of the Tennessee company at the end of the first week of October, the percentage of plant operations in the district last month was considerably lower than in September. There has been a good improvement in rail inquiries during the past two weeks. In lines other than rails, backlogs are increasing despite high mill operations. Prices are strong. A large amount of structural steel business is in prospect. Mills are operating full time and some are on double shift. The Southern Steel & Rolling Mill will furnish 450 tons of bars for a new warehouse for the Stockham Pipe & Fittings Co. The aggregate tonnage of reinforcing bar business is good, although it is made up mostly of small orders. The Connors Steel Co. has booked an order for 325 tons for a barracks building at Fort Bragg, N. C. The active openhearths in the district were increased to 14 when the Tennessee company put on three at Ensley on Oct. 23. Seven are active at Fairfield, and the Gulf States Steel Co. continues with four at Alabama City.

Cast Iron Pipe.—There is little demand from either private or municipal sources. Backlogs are low as a result of recent light bookings. On the few sales that are being made, makers are holding closely to quotations of $36 to $37 on 6 in. and larger sizes. Production remains steady.

Coke.—Practically all foundry coke consumers not under contract are buying as needed, sales averaging two to

three weeks ahead of requirements. Coke under contract is moving out in fairly satisfactory volume. Quotations remain at $5 for both spot and contract.

Old Material.—Sales have dropped off a little, and some consumers have held up shipments for the present. Dealers are still experiencing a little trouble in finding material to apply on some contracts. Prices are fairly firm.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$12.50
Scrap steel rails	$12.00 to 12.50
Short shoveling turnings	8.00 to 8.50
Cast iron borings	8.00
Stove plate	13.50
Steel axles	19.00 to 20.00
Iron axles	21.00 to 22.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	14.00 to 15.00
No. 1 cast	15.00
Tramcar wheels	13.00 to 14.00
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem	13.50 to 14.00

Boston

Pig Iron Price Trend Upward—Scrap Gains Further Strength—Structural Steel Projects Revived

BOSTON, Oct. 30.—The trend of pig iron prices unquestionably is upward. The most active Buffalo furnace is getting $17.50 a ton, furnace, for No. 2 plain and $18 for No. 2 X. For No. 1X $19 a ton, furnace, is openly quoted, but has been shaded. Other New York State iron is generally $18 a ton, base furnace, with 50c. a ton differentials. The Mystic Iron Works is meeting the Buffalo and other New York State furnace prices. Virginia iron is $20 a ton, base furnace, with not more than 50,000 tons available. New England foundries in general are busier than at any time this year and have purchased several thousand tons of iron in the past week. The market has been more active than in previous weeks of October. Sales included one lot of 1800 tons of No. 2X to a Massachusetts melter, about 800 tons of No. 2X and No. 1X to a stove maker in this State, and numerous smaller lots for fourth quarter and first quarter. Two small lots of charcoal iron were sold at $24 a ton, base furnace. Indian iron is sold into December. The largest open inquiry in the market is from the Gilbert & Barker Mfg. Co., Springfield, Mass., for 1000 tons of foundry iron, deliveries to run into 1929.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25	$22.41
*Buffalo, sil. 2.25 to 2.75	22.91
†Buffalo, sil. 1.75 to 2.25	21.28
†Buffalo, sil. 2.25 to 2.75	21.78
East. Penn., sil. 1.75 to 2.25	23.65
East. Penn., sil. 2.25 to 2.75	24.15
Va., sil. 1.75 to 2.25	26.91
Va., sil. 2.25 to 2.75	27.41
Ala., sil. 1.75 to 2.25	$23.16 to 25.02
Ala., sil. 2.25 to 2.75	23.66 to 25.52

Freight rates: $4.91 all rail and $3.78 rail and water from Buffalo; $3.65 from eastern Pennsylvania; $5.21 all rail from Virgina, $6.91 to $8.77 from Alabama.
*All rail rate. †Rail and water rate.

Coke.—October deliveries of by-product foundry coke will run ahead of those in September, largely because of increased production by the New England Coal & Coke Co. Ovens are still behind on deliveries, however. Foundries are specifying against contracts for stocking purposes as well as for current needs. The price is still $11 a ton, delivered within a $3.10 freight rate zone. The November price has not been announced. The outstanding feature of the coke market is the large demand for domestic fuel. New England fuel is meeting stiff competition from coke made outside these States, which is bringing less than $8.30 a ton, delivered to dealers.

Shapes and plates.—The market for standard shapes is now firmly established at 1.90c. per lb., Pittsburgh, and indications point to 2c. after Oct. 31, when lower-priced protection given large consumers will be withdrawn. The plate market also is firm at 1.90c., Pittsburgh.

Fabricated Steel.—Several fabricating jobs that have been dormant for months have come to life, and the market is more active. Figures will soon be asked on several thousand tons for a local office building, on 2000 tons for a Brookline, Mass., apartment hotel, on a larger tonnage for the Boston & Maine Railroad hotel, while numerous other jobs ranging from 100 to 500 tons bring the aggregate of probable business to at least 15,000 tons.

Warehouse Business.—Local warehouses are moving more iron and steel products than in months. Current orders are numerous and involve larger quantities than in any month this year.

Old Material.—Scrap prices are holding strongly, while supplies are growing smaller. Brokers with old contracts cannot fill them except at a financial loss. Material moving out of New England is going to eastern as well as to western Pennsylvania. New England consumers apparently have covered their requirements for the remainder of 1928. Pennsylvania consumers will not pay more for rails for rerolling than for No. 1 heavy melting steel. While $6.25 to $6.50 a ton on cars shipping point is the general price range on steel mill borings and mixed borings and turnings, at least one broker is paying $6.60. Unable to secure steamer space for Danzig shipments owing to heavy grain exports to England and the Continent, exporters have temporarily stopped buying. The export market for automobile scrap is therefore nominal at $10 to $10.25 a ton, on dock here. The Navy Yard, Boston, and the Boston & Albany Railroad on Nov. 1 will close bids on a small amount of scrap.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$11.50 to $12.00
Scrap T rails	11.00 to 11.50
Scrap girder rails	10.50 to 11.00
No. 1 railroad wrought	11.50 to 12.00
No. 1 yard wrought	9.50 to 10.00
Machine shop turnings	7.00 to 7.50
Cast iron borings (steel works and rolling mill)	6.25 to 6.60
Bundled skeleton, long	9.00 to 9.50
Forge flashings	9.50 to 10.00
Blast furnace borings and turnings	6.25 to 6.60
Forged scrap	7.00 to 7.50
Shafting	14.50 to 15.00
Steel car axles	16.50 to 16.75
Wrought pipe 1 in. in diameter (over 2 ft. long)	10.00 to 10.50
Rails for rolling	11.00 to 11.50
Cast iron borings, chemical	10.00 to 10.25
Prices per gross ton deliv'd consumers' yards:	
Textile cast	$14.00 to $14.50
No. 1 machinery cast	15.50 to 16.00
No. 2 machinery cast	13.50 to 14.00
Stove plate	11.00 to 11.50
Railroad malleable	15.00 to 15.50

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Youngstown

Steel Shipments Exceed New Business

YOUNGSTOWN, Oct. 30.—Most of the 10-in. pipe for the Roxana Petroleum Co. oil line from McCamey to Houston, Tex., will be furnished by the Youngstown Sheet & Tube Co. The complete line will take about 45,000 tons. All of the pipe mills of this company, except one buttweld unit, which ordinarily is held for emergency demands, are in operation. The Republic Iron & Steel Co. is keeping five of its seven units in production. Line pipe still is the backbone of the demand, but there is a constant call for seamless pipe for deep well drilling. Excepting on line pipe, in which there is usually active competition and resultant variation in quotations, prices are holding well, and in the secondary market the price situation is better stabilized than in several years.

Mills in this district are well sup-

plied with sheet orders, although in most cases shipments on old business are outstripping new bookings. The steel output of nine open-hearth furnaces of one local sheet maker is required for the sheets going to the Ford Motor Co. That company is steadily increasing its production and late reports indicate a daily output of more than 5500 units. Demands from several other car builders are lighter than recently. Sheet prices are holding well, although it is admitted that occasional concessions in the common finishes are encountered. These deviations, however, are not viewed with concern, as in the strongest of markets there is always some business that goes at less than the regular prices.

In general, order books appear to be decreasing. Steel works operations are in the main holding a little below the extreme peak of a fortnight ago. Promises of deliveries on new inquiries are less extended, which would rather point to some recession in plant activities as backlogs work down.

In the scrap market, sales of heavy melting steel at $18.50 to a local melter, who also bought compressed sheets at $18 or possibly a little more and turnings at $13, stand out. These purchases, however, are looked upon as the end of the rise in scrap, which had its basis in the urgency of steel demands, which forced a high rate of steel production and consequently increased the use of scrap, since it was considered doubtful that the demand would hold sufficiently long to warrant the starting of idle blast furnaces.

operating practically at full capacity and are taking liberal tonnages of bars. Prices are firm at 1.95c. to 2c., base Pittsburgh. In common wire nails there has been no deviation from the regular schedule of $2.69 per keg, delivered Cincinnati. District sheet mills have slightly bettered their position in the past week from the standpoint of backlogs. A healthy demand is reported from consumers and little change in this favorable situation is anticipated in the next 30 days. By that time producers are confident that automobile companies will be coming into the market rather heavily for their requirements. Galvanized sheets are steady at 3.50c., base Pittsburgh, blue annealed at 2c., black at 2.75c. and automobile body stock at 4c. Cold-rolled strip steel is firm at 2.75c. to 2.85c., base Pittsburgh. Makers of rail steel reinforcing bars are quoting 1.85c. to 1.90c., base mill.

Old Material.—While the market is holding its recent gains and there have been further advances in a few items, there are signs of increasing caution on the part of dealers. Some scrap has been purchased in the past few days at less than was paid a week ago. District mills are content to go along with present yard stocks without anticipating future needs. The Big Four has a list totaling 1600 tons closing this week.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$13.50 to $14.00
Scrap rails for melting	14.00 to 14.50
Loose sheet clippings	9.50 to 10.00
Bundled sheets	10.25 to 10.75
Cast iron borings	9.75 to 10.25
Machine shop turnings	9.25 to 9.75
No. 1 busheling	11.00 to 11.50
No. 2 busheling	6.50 to 7.00
Rails for rolling	14.00 to 14.50
No. 1 locomotive tires	14.00 to 14.50
No. 2 railroad wrought	13.50 to 14.00
Short rails	19.00 to 19.50
Cast iron carwheels	12.50 to 13.00
No. 1 machinery cast	18.50 to 19.00
No. 1 railroad cast	14.75 to 15.25
Burnt cast	10.50 to 11.00
Stove plate	10.50 to 11.00
Brake shoes	10.25 to 10.75
Railroad malleable	13.50 to 14.00
Agricultural malleable	13.00 to 13.50

Cincinnati

Southern Ohio Foundry Iron Advanced 50c. a Ton—Steel Demand Continues Fairly Strong

CINCINNATI, Oct. 30.—While pig iron sales have been confined to small miscellaneous lots for prompt delivery, prices remain strong. Northern Ohio foundry iron is quoted at $18, base furnace, and southern Ohio foundry at $18, base Ironton, an advance of 50c. a ton. A Tennessee producer is offering iron for first quarter shipment at $16.25, base Birmingham, but Alabama furnace interests are not willing to sell beyond this year at that price. In fact, the possibility of an increase of 50c. or 75c. a ton on Southern iron is being discussed in the local trade. The only sizable pending inquiry calls for 600 tons of foundry for a Michigan melter. Jackson County silvery iron is firm at $25, base furnace, for 8 per cent.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89
Ala. fdy., sil. 1.75 to 2.25	19.94
Ala. fdy., sil. 2.25 to 2.75	20.44
Tenn. fdy., sil. 1.75 to 2.25	19.94
S'th'n Ohio silvery 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Coke.—Despite a slight slackening of demand for by-product foundry coke in the last two weeks, shipments in October have been ahead of those of September; in domestic grades the betterment has been even more pronounced on account of cooler weather. By-product coke makers have announced that the current schedule of $7, ovens, will stay in effect during November, but an increase of from 25c. to 50c. a ton on egg and walnut sizes is certain, although the exact amount has not been determined. For delivery during the remainder of this year and during the first six months of 1929, Wise County beehive foundry coke is being sold at $5 to $5.25, ovens, and New River foundry at $6.50 to $7, ovens.

Finished Material.—Specifications and orders for bars, structural shapes and plates have trended upward on account of a well diversified demand from all consuming lines. Agricultural implement manufacturers are

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	3.90c.
Galvanized sheets (No. 24)	4.75c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb	$3.00
Com. wire nails, base per keg	2.95
Cement c't'd nails, base 100 lb. keg	2.95
Chain, per 100 lb	7.55
	Net per 100 Ft.
Lap-weld. steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

St. Louis

Pig Iron Sales Exceed 16,000 Tons—Scrap Again Advances on Heavy Buying

ST. LOUIS, Oct. 30.—Another week of heavy buying marked the pig iron market here, sales of the St. Louis Gas & Coke Corporation totaling 16,350 tons, of which 2750 tons was malleable, 2000 tons basic, and the remainder foundry iron. Most of the purchases were for shipment in the first quarter, although buying for prompt delivery and November-December was unusually heavy. Several weeks ago it was believed that buying for the last quarter had been completed, but the situation changed largely through the activities of stove foundries. Stove plants here and in Belleville and Quincy are enjoying a tremendous volume of business, which has been stimulated by the production of novelty enameled heaters, lines that are much sought in rural communities. Mail order houses have been heavy buyers of these stoves. More than 7000 tons of the local maker's sales of foundry iron went to stove manufacturers, in lots from 100 to 1000 tons, the latter order to a local manufacturer for shipment this year. Shipments continue heavy and the local maker, operating only one of its two furnaces, has been able to reduce materially its surplus stock of iron. The Granite City maker is selling in Chicago territory at recent advances of makers there, but has

made no advance here because of Southern competition.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.50 to $20.00
N'th'n No. 2 fdy., deliv'd St. Louis	21.16
Southern No. 2 fdy., deliv'd	20.67
Northern malleable, deliv'd	21.16
Northern basic, deliv'd	21.16

Freight rates: 81c. Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Iron and Steel.—Buying of plates, shapes and bars has subsided, and new business in sheets also is lighter. Warehouse business is about on a par with this time last year, although slightly better than last month. Fabricators of structural steel report little business.

Old Material.—Prices for old material continue to advance, following heavy buying by four large consumers during the past week to 10 days. Strength in Chicago and other centers has also added to the firmness of the market here. Stocks in the hands of some consumers are sufficient for the next four to six weeks, while others' stocks are low. Most consumers are more eager to buy than dealers are to sell at present levels. Advances of 25c. a ton were recorded in heavy shoveling and melting steel, No. 2 railroad wrought, steel car axles, railroad springs, steel angle bars, railroad malleable, and stove plate, while miscellaneous standard-section rails are 50c. higher and steel rails less than 3 ft. are up $1.50. No. 1 machinery cast is $1 lower. Railroad lists include: Pennsylvania, 7165 tons; Chicago, Burlington & Quincy, 4695 tons; Union Pacific, 2723 tons; Terminal Railway of St. Louis, 2250 tons; Big Four, 1650 tons; Missouri Pacific, 111 carloads; Chicago, Milwaukee, St. Paul & Pacific, 102 carloads; Nickel Plate (rail), 17 carloads; Mobile & Ohio, 10 carloads; Standard Oil, 5 carloads.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24)	4.10c.
Galv. sheets (No. 24)	4.95c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.15c.
Galv. corrug. sheets	5.00c.
Structural rivets	3.75c.
Boiler rivets	3.75c.

	Per Cent Off List
Tank rivets, ⅞-in. and smaller, 100 lb. or more	65
Less than 100 lb	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-press. nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb	50

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$13.25 to $13.75
No. 2 heavy melting or shoveling steel	12.25 to 12.75
No. 1 locomotive tires	14.50 to 15.00
Miscel. stand-sec. rails including frogs, sw'ches and guards, cut apart	14.50 to 15.00
Railroad springs	15.50 to 16.00
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought	13.25 to 13.75
No. 1 busheling	9.25 to 9.75
Cast iron borings	8.50 to 9.00
Iron rails	13.00 to 13.50
Rails for rolling	15.00 to 15.50
Machine shop turnings	9.00 to 9.50
Steel car axles	18.50 to 19.00
Iron car axles	27.00 to 27.50
Wrot. iron bars and trans.	20.25 to 20.75
No. 1 railroad wrought	11.50 to 12.00
Steel rails, less than 3 ft.	17.00 to 17.50
Steel angle bars	14.00 to 14.50
Cast iron carwheels	13.50 to 14.00
No. 1 machinery cast	14.00 to 14.50
Railroad malleable	13.75 to 14.25
No. 1 railroad cast	14.00 to 14.50
Stove plate	12.50 to 13.00
Agricult. malleable	11.50 to 12.00
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Canada

Pig Iron and Scrap Markets Continue Active—Viaduct Takes 7000 Tons of Steel

TORONTO, ONT., Oct. 30.—Current pig iron business is almost entirely confined to spot delivery, but such orders are appearing frequently. A few inquiries have appeared for foundry and malleable iron for winter requirements of consumers who are prepared to take immediate delivery. Shipments against contracts are going out on schedule. Production of iron continues at the former high level, with seven furnaces active. Prices are strong.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$23.60
No. 2 fdy., sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	25.00
No. 2 fdy., sil. 1.75 to 2.25	25.00
Malleable	25.00
Basic	24.00
Imported Iron, Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Structural Steel.—Several new projects have been announced requiring tonnages of structural and reinforcing steel. The Dominion Bridge Co., Toronto, has been awarded upward of 7000 tons of steel for the new Toronto viaduct. About 5000 tons will be required for a bridge between Lachine and Coughnawaga for the Department of Public Works, Quebec. For a new automobile building for the Canadian National Exhibition, Toronto, 1200 tons will be needed.

Old Material.—Buying is general throughout Ontario and Quebec. Large consumers in the Toronto and Hamilton districts are furnishing the bulk of current business, but in most cases these consumers are not placing forward contracts. Heavy melting steel and turnings are going to consumers in the Hamilton district in large tonnages and new orders are appearing. Machinery cast is in strong demand and stove plate and malleable scrap are gaining strength in Ontario. Montreal dealers report good orders for machinery cast, wrought iron and steel axles and heavy melting steel. Export business from the Montreal district is increasing.

Dealers' buying prices:

	Per Gross Ton		Per Net Ton	
	Toronto	Montreal		
Heavy melting steel	$9.50	$7.00		
Rails, scrap	10.00	9.00		
No. 1 wrought	9.00	11.00		
Machine shop turnings	7.00	5.00		
Boiler plate	7.00	6.00		
Heavy axle turnings	7.50	6.50		
Cast borings	7.50	5.00		
Steel turnings	7.00	5.50		
Wrought pipe	5.00	5.00		
Steel axles	14.00	20.00		
Axles, wrought iron	16.00	22.00		
No. 1 machinery cast	....	16.00	15.00	....
Stove plate	....	13.00	9.00	....
Standard carwheels	....	16.00	13.00	....
Malleable	....	13.00	13.00	....

Buffalo

Pig Iron Advanced—Scrap Strong

BUFFALO, Oct. 30.—Buffalo pig iron has been advanced 50c. a ton, bringing the Buffalo base for No. 2 plain foundry to $17.50 for outside delivery and to $18.50 for district delivery. The malleable price is up to $18 for outside delivery and to $19 for this district. Books have been opened for first quarter on these bases and considerable inquiry has come out. Among the lots sought are 2000 tons of malleable, 2500 to 3500 tons of foundry for a melter in the Utica district, two from the vicinity of New York City for 1000 tons of foundry each, one for 1000 tons from New England and one for 1500 tons of foundry. The General Electric Co. is in the market for part of 1000 tons of foundry and malleable for its Erie, Pa., plant. The Eastern Malleable Iron Co. bought 1000 tons of malleable for Wilmington, Del., and Troy, N. Y. Several 500-ton inquiries for foundry and malleable have come out, mostly from the East. The situation in the immediate district is that almost all the melters are covered for this quarter and have not yet gone into their requirements for the first quarter. Reports here are that Port Henry iron is now being sold on an $18.50 to $19 base. No pig iron was shipped over the barge canal last week.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$17.50 to $18.50
No. 2X fdy., sil. 2.25 to 2.75	18.00 to 19.00
No. 1X fdy., sil. 2.75 to 3.25	19.00 to 20.00
Malleable sil. up to 2.25	18.00 to 19.00
Basic	17.50 to 18.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Operations are being maintained by Buffalo mills at the high rate of recent weeks. Bars are being quoted at 2.05c. to 2.10c. and plates and shapes at 2c. to 2.10c., Buffalo. On black sheets, 2.75c. is firm, and on galvanized the range is 3.50c. to 3.60c. Specifications are

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-fin. flats, sq. and hex	4.45c.
Rounds	3.95c.
Cold rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb	3.75

very good. Reinforcing bar business is confined to small lots, but the price is firm at 2.515c., warehouse. The Buffalo State Hospital addition will require about 350 tons of fabricated structural shapes. Operations at the Bethlehem Lackawanna plant are at 90 to 95 per cent, with all the mills on double turn and the rail mill in operation; the Donner Steel Co. is also running at 95 per cent, the Seneca Iron & Steel Co., 95 per cent; the Wickwire-Spencer Corporation, 95 to 100 per cent, and the Buffalo Bolt Co., 75 per cent. The steel making facilities at Lackawanna plant have been increased by the operation of the Bessemer plant.

Old Material.—The market is strong, but there have been no new sales of size. Many old orders are still out, and dealers are finding it difficult to fill some $15.50 orders for No. 1 steel. Great activity is apparent in this district on the part of Pittsburgh and Youngstown dealers, who are negotiating for Nos. 1 and 2 steel. A mill which last week bought strictly No. 1 grade heavy melting steel at $16.75 to $17 has notified dealers to regulate shipments. Some hydraulic compressed sheets are going to Youngstown from Buffalo at $15.75 to $17, Youngstown. A car of knuckles and couplers has been sold for $18.50, but the ruling price is nearer $17.50. Some machine shop turnings have been sold at $8.50 to $9, and the local blast furnaces will pay $11.50 for short shoveling steel turnings. Considerable difficulty is being experienced by dealers in filling outstanding orders for stove plate, which they are now buying at more than they sold for.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades		
No. 1 heavy melting steel	$15.75 to	$17.00
No. 2 heavy melting steel		14.25
Scrap rails	15.50 to	16.00
Hydraulic comp. sheets		14.25
Hand bundled sheets	12.00 to	12.50
Drop forge flashings	13.50 to	14.00
No. 1 busheling	14.75 to	16.00
Hvy. steel axle turnings	13.50 to	14.00
Machine shop turnings	8.50 to	9.00
No. 1 railroad wrought	14.50 to	15.00
Acid Open-Hearth Grades		
Knuckles and couplers	17.00 to	17.50
Coil and leaf springs	17.50 to	18.00
Rolled steel wheels	17.00 to	17.50
Low phos. billet and bloom ends	18.00 to	18.50
Electric Furnace Grades		
Short shov. steel turnings	11.00 to	11.50
Blast Furnace Grades		
Short shov. steel turnings	11.00 to	11.50
Short mixed borings and turnings	11.00 to	12.00
Cast iron borings	11.00 to	12.00
No. 2 busheling	11.00 to	12.00
Rolling Mill Grades		
Steel car axles	18.75 to	19.25
Iron axles	21.00 to	22.00
Cupola Grades		
No. 1 machinery cast	15.50 to	16.00
Stove plate	14.50 to	15.00
Locomotive grate bars	13.00 to	13.50
Steel rails, 3 ft. and under	17.50 to	18.00
Cast iron carwheels	13.00 to	13.50
Malleable Grades		
Industrial	16.00 to	16.50
Railroad	16.00 to	16.50
Agricultural	16.00 to	16.50

New Officers of Foundrymen's Sand Committee

Following the resignation of B. D. Fuller as chairman of the American Foundrymen's Association committee on molding sand research, Fred Erb of the Erb-Joyce Foundry Co., Detroit, and vice-president of the A. F. A., has been appointed general chairman of the committee. Mr. Fuller retains his interest in the committee's activities and remains on the executive committee.

A new position, that of technical director, has been created in the committee's organization, and Dr. H. Ries, head of the department of geology of Cornell University, has been selected to fill the position.

Dr. Ries has been connected with the work of the committee since its inauguration in 1921, first as chairman of the sub-committee on geological survey of foundry sand resources and later as chairman of the sub-committee on tests. One of the most eminent of economic geologists of the country and an authority on clays, Dr. Ries was a pioneer in investigating foundry sands, for his work in 1904 and 1905 on the surveys of the foundry sand resources of Michigan and Wisconsin was perhaps the earliest systematic investigation of foundry sands. For his earlier work in connection with the committee in its development of sand testing methods, honorary membership in the American Foundrymen's Association was conferred upon Dr. Ries.

The committee on molding sand research, organized in 1921 as a joint committee of the A. F. A. and of the engineering division of the National Research Council, under the chairmanship of Mr. Fuller, recently issued its second volume of "Standard and Tentatively Adopted Methods of Testing and Grading Foundry Sands." The work of the committee as a whole has been of great value to foundrymen in placing foundry sands under technical control. Its future work will be to simplify test methods, carry on research projects and formulate sand grading classifications.

By-Product Coke Corporation is preparing plans which will result in a substantial increase in pig iron output by its Federal furnace property at Chicago.

Railroad Equipment

Large Orders Placed in Company Shops

FREIGHT cars placed in company shops featured the market this week. Orders included 500 automobile cars by the Norfolk & Western, 300 box cars by the Southern Pacific and 300 refrigerator cars by Swift & Co. The Northern Refrigerator Co. has placed 300 refrigerator cars with a car builder. The Buffalo, Rochester & Pittsburgh, whose prospective inquiry for 1000 box cars was mentioned last week, may also purchase 1000 hopper cars. Details of the week's business follow:

Delaware, Lackawanna & Western has ordered 20 locomotives from American Locomotive Co. and has placed 100 box cars with American Car & Mfg. Co.

Alaska Railroad has ordered one Mikado type locomotive from Baldwin Locomotive Works.

Pacific Fruit Express is inquiring for one 0-4-0 type locomotive.

Norfolk & Western expects to purchase 10 all-steel express cars and five mail and baggage coaches. This road has also placed orders for 500 all-steel automobile box cars at its Roanoke, Va., shops.

Chicago, Rock Island & Pacific is inquiring for 15 passenger coaches.

Swift & Co. are building 300 refrigerator cars in their own shops.

Southern Pacific, Texas Lines, will build 300 box cars in its own shops.

Chesapeake & Ohio has renewed its inquiry for six gas-electric rail motor cars.

Chiriqui Land Co., Panama, is inquiring for 50 15-ton freight cars.

Royal State Railways of Siam have made inquiry through C. P. Sanderson, 100 Broadway, New York, for 300 low side all-steel cars of 12 tons capacity.

Northern Refrigerator Co. has ordered 300 refrigerator cars from Pullman Car & Mfg. Corporation.

Buffalo, Rochester & Pittsburgh is now expected to inquire for 2000 freight cars, instead of 1000, as reported last week. In addition to 1000 box cars, it will probably ask for 1000 hopper cars.

Canadian National's car requirements are now stated to be 3300, of which about 2300 will be placed in Canada and the remainder in the United States.

Illinois Central will buy four electric switching locomotives.

Chicago & North Western is in the market for 400 low side gondola cars. Inquiries for additional cars will be made in a few days.

Detroit Scrap Market Continues Strong

DETROIT, Oct. 30.—Shipments of pig iron, which are approximately the same as for September, promise to be on a higher basis in November, when new automobile models get into production.

The market on old material continues strong.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$13.00 to $13.50
Borings and short turnings	9.00 to 9.50
Long turnings	8.00 to 8.50
No. 1 machinery cast	14.00 to 15.00
Automobile cast	19.00 to 20.50
Hydraul. comp. sheets	12.25 to 12.75
Stove plate	11.00 to 12.00
No. 1 busheling	10.00 to 10.50
Sheet clippings	8.00 to 8.50
Flashings	10.75 to 11.25

Non-Ferrous Metal Markets

Copper Again Advanced and Active, Tin Quiet and Strong, Lead and Zinc Unchanged

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Oct. 30	Oct. 29	Oct. 27	Oct. 26	Oct. 25	Oct. 24
Lake copper, New York	16.25	16.25	16.00	16.00	15.62½	15.62½
Electrolytic copper, N. Y.*	15.75	15.75	15.50	15.50	15.25	15.25
Straits tin, spot, N. Y.	49.25	49.12½	....	48.45	48.45	48.50
Lead, New York	6.50	6.50	6.50	6.50	6.50	6.50
Lead, St. Louis	6.32½	6.32½	6.32½	6.32½	6.32½	6.32½
Zinc, New York	6.60	6.60	6.60	6.60	6.60	6.60
Zinc, St. Louis	6.25	6.25	6.25	6.25	6.25	6.25

*Refinery quotation; delivered price ¼c. higher.

Copper.—Prices have advanced ½c. per lb. in the past week. Electrolytic copper was sold on Oct. 26 at 15.75c., delivered in the Connecticut Valley, and then went to 16c. on Oct. 29. This was followed on Oct. 30 by an advance in the export price by Copper Exporters, Inc., to 16.25c., European ports. Producers say that consumers have become anxious about future supplies and prices, and have caused the advances. They feel that many consumers have overbought. They assert, however, that there is or will be plenty of copper to go around and that anxiety is not well founded. Domestic consumers have been buying into January, with estimates that 80 per cent of their requirements for that month are covered. Some producers are now selling for February delivery. Sales to foreign consumers have been very heavy in October, with the total estimated at over 80,000 tons up to Oct. 30. Domestic consumers are practically covered through December, but foreign users must still buy some metal for this year, although they, too, have purchased considerable for January delivery. Lake copper is also active and higher at 16.12½c. to 16.25c., delivered, the latter price for delivery on the Atlantic seaboard.

Tin.—Sales for the week ended Oct. 27 were about 1000 tons, with dealers practically the only buyers. The market has been featureless and quiet, with consumers well covered to Dec. 31 and not buying. On Oct. 29, the London market advanced because of purchases of about 600 tons by a new tin company, recently organized, which has been active in selling stock. The market here on that day was very quiet, with only 100 tons sold. Tuesday, Oct. 30, there was more activity, about 250 tons changing hands at 49c. to 49.25c. for spot delivery, New York. London quotations Tuesday were £226 7s. 6d. for spot standard, £222 15s. for future standard, and £226 15s. for spot Straits. Arrivals thus far this month have been heavy at 6940 tons, with 6120 tons reported afloat.

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	50.50c. to 51.50c.
Tin, bars	52.50c. to 53.50c.
Copper, Lake	16.75c.
Copper, electrolytic	16.50c.
Copper, casting	15.75c.
Zinc, slab	7.25c. to 7.75c.
Lead, American pig	7.50c. to 8.00c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	12.75c. to 13.25c.
Aluminum No. 1 ingots for remelting (guar'nt'd over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy,	24.00c. to 25.00c.
Babbitt metal, commerc'l grade,	30.00c. to 40.00c.
Solder, ½ and ½	32.50c. to 33.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	54.50c.
Tin, bar	56.50c.
Copper, Lake	17.00c.
Copper, electrolytic	17.00c.
Copper, casting	16.75c.
Zinc, slab	8.00c.
Lead, American pig	7.00c. to 7.25c.
Lead, bar	9.50c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade	18.75c.
Babbitt metal, high grade	59.00c.
Solder, ½ and ½	33.00c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	20.25c.
Copper, hot rolled	25.00c.
Copper, cold rolled, 14 oz. and heavier	26.25c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes	28.25c.
Brass Rods	18.00c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open	11.00c. to 11.50c.

Non-Ferrous Rolled Products

Mill prices on brass products were advanced ¼c. on Oct. 25 and a similar amount on Oct. 27, while quotations on copper materials have been raised ¾c. in the last week, ⅜c. on each of the above dates. Zinc sheets are quoted at 9.75c., base, and lead full sheets at 10c. to 10.25c.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	20.50c.
Copper, hot rolled	25.00c.
Zinc	9.75c.
Lead (full sheets)	10.00c. to 10.25c.
Seamless Tubes—	
High brass	25.37½c.
Copper	26.50c.
Rods—	
High brass	18.25c.
Naval brass	20.25c.
Wire—	
Copper	17.87½c.
High brass	21.00c.
Copper in Rolls	24.00c.
Brazed Brass Tubing	28.50c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	13.75c.	15.00c.
Copper, hvy. and wire	13.50c.	14.50c.
Copper, light and bottoms	11.50c.	12.75c.
Brass, heavy	7.75c.	9.00c.
Brass, light	6.50c.	7.50c.
Hvy. machine composition	10.25c.	11.25c.
No. 1 yel. brass turnings	9.25c.	9.75c.
No. 1 red brass or compos. turnings	9.50c.	10.50c.
Lead, heavy	5.25c.	5.625c.
Lead, tea	3.75c.	4.25c.
Zinc	3.25c.	3.625c.
Sheet aluminum	12.50c.	14.50c.
Cast aluminum	11.75c.	13.50c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	20.50c.
Copper, hot rolled	25.00c.
Copper, cold rolled, 14 oz. and heavier	27.25c.
Zinc	10.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	26.87½c.
Copper	27.87½c.
Brass Rods	18.25c.
Brazed Brass Tubes	28.50c.

Lead.—Better than normal buying has prevailed recently, with the main interest in prompt and November delivery. Consumers thus far have shown little desire to purchase December metal. In the West, prices are firm at 6.32½c., St. Louis, with the quotation of the leading interest unchanged at 6.50c., New York, as its contract price.

Zinc. — Producers report a fair amount of business each day, and it is expected that October will show a respectable total in sales. Prices continue steady at 6.25c., East St. Louis, or 6.60c., New York. The ore situation is unchanged. The price is still $40, Joplin; production and shipments last week practically balanced.

Antimony. — The market is quiet and Chinese metal is unchanged at 10.50c. for spot and 10.25c. for futures, duty paid, New York.

Nickel. — Wholesale lots of ingot nickel are quoted at 35c. with shot nickel at 36c. and electrolytic nickel at 37c. per lb.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Oct. 30.—Prices for copper and tin have advanced in an active market. The old metal market is stronger and sales are in good volume.

Prices, per lb., in carload lots: Lake copper, 16.75c.; tin, 49.75c.; lead, 6.40c.; zinc, 6.35c.; in less-than-carload lots; antimony, 11.50c. On old metals, we quote copper wire, crucible shapes and copper clips, 11.75c.; copper bottoms, 10.50c.; red brass, 10.50c.; yellow brass, 8c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 30c.; tin foil, 36.25c.; block tin, 45.25c.; aluminum, 12c., all being dealers' prices for less-than-carload lots.

Fabricated Structural Steel

Awards Total 30,400 Tons With 6700 Tons for Steel Mill Extensions—33,500 Tons in New Projects

AWARDS of 30,400 tons included 6700 tons for extensions to the Indiana Harbor, Ind., plant of the Youngstown Sheet & Tube Co. and 6860 tons for a group of jobs at New York. New projects, amounting to 33,500 tons, were featured by a number of jobs of fair size. Awards follow:

EAST HAMPTON, MASS., 275 tons, bridge, to Boston Bridge Works, Inc.

BETHEL, VT., 184 tons, State bridge, to Boston Bridge Works, Inc.

NEW YORK, 6860 tons in the following awards as reported to the Structural Steel Board of Trade, Inc.: addition to St. George Hotel, Brooklyn, and service building for Willard Parker Hospital in East Tenth Street, to McClintic-Marshall Co.; loft building at 42 West Forty-eighth Street and apartment building at Park Avenue and Ninety-sixth Street, to Lehigh Structural Steel Co.

NEW YORK, 2500 tons, loft building at Madison Avenue and Fifty-second Street, to A. E. Norton, Inc.

NEW YORK, 700 tons, apartment building at 2780 Broadway, to Easton Structural Steel Co.

NEW YORK, 200 tons, building for Plaza Trust Co. at 655 Fifth Avenue, to La-Cour Iron Works.

NEW YORK, 100 tons, addition to office building at 58 Varick Street, to Structural Iron Works.

NEW YORK, 500 tons, theater at St. Mark's Place, Staten Island for Isle Theater Corporation, to Harris Structural Steel Co.

BROOKLYN, 1200 tons, St. John's Law School, to Hinkle Steel Construction Co.

BROOKLYN, 220 tons, pan house at Greenpoint plant of Improved Cinder Co., to Belmont Iron Works.

BROOKLYN, 160 tons, bank and office building in Wyckoff Street, to National Bridge Works.

CLINTON, N. Y., 500 tons, bridge for State Highway Department, to American Bridge Co.

MOUNT VERNON, N. Y., 166 tons, Junior beams for Terrace Arms apartment building, to Jones & Laughlin Steel Corporation.

JERSEY CITY, 1200 tons, Journal Square Theater, to Harris Structural Steel Co.; reported previously to unnamed fabricator.

KENVILLE, N. J., 150 tons, building for Hercules Powder Co., to Austin Co., Cleveland.

HARRISBURG, PA., 350 tons, Mystic Shrine Zembo Temple, to Jones & Laughlin Steel Corporation.

PHILADELPHIA, PA., 600 tons, addition to Trayler-Allerton Hotel, to Bethlehem Fabricators, Inc.

STATE OF VIRGINIA, 370 tons, Nottoway River bridge, to Virginia Bridge & Iron Co.

BIRMINGHAM, 450 tons, warehouse for Stockham Pipe & Fittings Co., to Southern Steel Works.

SOUTHERN RAILWAY, 600 tons, bridges, to American Bridge Co.

KALAMAZOO, MICH., 1000 tons, Kalamazoo Trust and Savings Bank Building, to American Bridge Co.

DETROIT, 1500 tons, building for United States Gypsum Co., to American Bridge Co.

CLEVELAND, 475 tons, Nickel Plate Railroad bridge, to Fort Pitt Bridge Works.

MUNCIE, IND., 100 tons, Junior beams, Nurses' Home, Ball Memorial Hospital, to Jones & Laughlin Steel Corporation.

SAO PAULO, BRAZIL, 261 tons, Junior beams, General Motors Corporation assembly plant, to Jones & Laughlin Steel Corporation through Mahon Structural Steel Co., Detroit.

EVANSTON, ILL., 165 tons, cafeteria wing for Township High School, to Wendnagel & Co., Chicago.

CHICAGO, 265 tons, canopy for La Salle Street station, to Edgers Schillo Co., local.

CHICAGO, 1125 tons, Trust & Savings Bank Co., to American Bridge Co.

INDIANA HARBOR, IND., 6735 tons, extensions for Youngstown Sheet & Tube Co.; open-hearth building, 2800 tons, to McClintic-Marshall Co., and merchant mill building, 3935 tons, to Hansel Elcock Co.

BLOOMINGTON, ILL., 400 tons, office building, to Mississippi Valley Structural Steel Co.

DECATUR, ILL., 900 tons, Staley Building, to Mississippi Valley Structural Steel Co.

WENATCHEE, WASH., 230 tons, plates, 18-in. pipe line, Beebe Orchard Co., to Beale Tank & Pipe Co.

OAKLAND, CAL., 100 tons, plates, Plummer ball joints, to Pacific Coast Engineering Co.

LOS ANGELES, 2000 tons, Bullock's department store, to Llewellyn Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

ROCKLAND, ME., 100 tons, Nurses' Home.

BOSTON, 1500 tons, Medical Arts building.

BOSTON, Brighton district, 500 tons, high school.

PROVIDENCE, R. I., 150 tons, savings bank.

NEW YORK, 5000 tons, apartment buildings for A. E. Lefcourt in Fifty-eighth Street near Sixth Avenue and in Fifty-ninth Street near Seventh Avenue.

NEW YORK, 2500 tons, apartment building at Third Avenue, Forty-seventh and Forty-eighth Streets.

NEW YORK, 1000 tons, public school No. 96.

NEW YORK, 900 tons, apartment building at Sixty-seventh Street and Central Park West.

NEW YORK, 900 tons, loft building at Fifth Avenue and Thirty-sixth Street.

NEW YORK, 700 tons, apartment building at Eighty-sixth Street and East End Avenue.

NEW YORK, 600 tons, apartment building at 237 East Twentieth Street.

NEW YORK, tonnage being estimated, apartment building at 602 East Eighty-fourth Street.

NEW YORK, tonnage being estimated, apartment building at Seventy-eighth Street and Amsterdam Avenue.

NEW YORK, tonnage being estimated, St. Vincent's Hospital at West New Brighton, S. I.

BROOKLYN, tonnage being estimated, apartment building at Prospect Park West and Garfield Place.

PHILADELPHIA, 2200 tons, plant for United States Gypsum Co.

PHILADELPHIA, 1000 tons, building for Philadelphia General Hospital; reported last week as 500 tons.

PHILADELPHIA, 900 tons, Institute for Mental Diseases.

NORFOLK & WESTERN RAILWAY, 500 tons, bridges.

NASHVILLE, TENN., 2000 tons, highway projects for State Highway Commission.

MEMPHIS, TENN., 900 tons, bank building.

LOUISVILLE & NASHVILLE, 1000 tons, bridges.

STATE OF ALABAMA, 2000 tons, highway bridges.

BUFFALO, 2000 tons, manufacturing building for Curtiss Airplane & Motor Co.; James Stewart & Co., Inc., general contractor.

FLINT, MICH., 600 tons, auditorium.

BUFFALO, 350 tons, addition to State hospital.

CHICAGO, 3300 tons, office building at 2042 Lake Shore Drive.

CHICAGO, 1100 tons, store building on South State Street.

SAN FRANCISCO, 2300 tons, Methodist Book Concern Building; McClintic-Marshall Co., low bidder.

PERSONAL

GEORGE T. LADD, whose election as president of the United Engineering & Foundry Co., Pittsburgh, was announced in THE IRON AGE last week, designed and built the largest water tube boilers in the world, at the Fordson plant, Ford Motor Co., and has many and varied business and engineering interests. He was born at Edinburgh, Ohio, in 1871, and was

G. T. LADD

graduated from the Sheffield Scientific School, Yale University, in 1891. He then went to Pittsburgh and entered the employ of the Pittsburgh & Lake Erie Railroad, with which he was connected until 1893, when he entered Cornell University and two years later was graduated with a mechanical engineering degree. For the next three years he was a designer at the Brooks Locomotive Works, Dunkirk, N. Y., leaving that company to become mechanical engineer in charge of engine and boiler sales for the Bass Foundry & Machine Co., Fort Wayne, Ind. After 11 years in that capacity he engaged in private consulting engineering in Pittsburgh and in 1910 organized the George T. Ladd Co., a combustion engineering company. The Ladd Water Tube Boiler Co. was organized in 1925, and shortly afterward it was taken over by the International Combustion Engineering Corporation, which about the same time bought out the Heine Boiler Co. Mr. Ladd went with the International corporation, as president of both the Ladd and Heine companies. He also became works manager of the parent organization and a member of its technical advisory board. Mr. Ladd is chairman of the Pittsburgh Testing Laboratories and an official of the Woodings Forge & Tool Co., Verona, Pa., the Davis Brake Beam Co., Johnstown, Pa., and the Columbian Enameling & Stamping Co., Terre Haute, Ind. He is a Lieutenant-Commander in the United States Naval Reserve.

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MARO JOHNSON, assistant engineer of the Illinois Central Railroad, was elected president of the American Railway Bridge & Building Association at the thirty-eighth annual convention held in Boston last week.

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JOHN W. HACKER, formerly superintendent of the coke plant of the Central Alloy Steel Corporation, Massillon, Ohio, has joined Dyer Engineers, Inc., Cleveland. His successor is JOHN M. KOMP.

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JOHN P. BANKSON has been appointed Cleveland district manager of sales General Refractories Co., Philadelphia. He has been with the company for six years, most of that time in the Cleveland office.

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RALPH M. BARNES has been appointed assistant professor of industrial engineering at the State University of Iowa, Iowa City.

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HAROLD C. OSMAN, secretary Nugent Steel Castings Co., Chicago, and heretofore in charge of sales for that company, has been appointed works manager.

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C. F. WILLIAMS has resigned as manager of sales for the Basic Products Co., subsidiary of the Allen S. Davison Co., Pittsburgh, to become sales manager of the Ward & Shaw Co., Cleveland, commercial printer. His successor is HUGH D. LARGEY, formerly Pittsburgh district manager of sales for the Colonial Steel Co., Pittsburgh. Mr. Williams, who is a graduate of the University of Illinois, class of 1910, was engaged in newspaper and trade paper editorial work prior to joining the Davison company in 1917. Mr. Largey is a graduate of Pennsylvania State College and had a brief experience in the open-hearth department of the Allegheny Steel Co., Brackenridge, Pa., before engaging in sales work with the Colonial company in 1922.

C. F. WILLIAMS

H. D. LARGEY

—

JOHN N. CRITCHLOW, formerly Detroit district sales representative Oliver Iron & Steel Corporation, Pittsburgh, is now its general manager of sales. He has been located in Detroit

J. N. CRITCHLOW

for a number of years, first as district sales manager Pittsburgh Crucible Steel Co., Pittsburgh, and later as a manufacturers' agent handling the products of the Atlas Drop Forge Co. and the Bethlehem Steel Co., besides those of the Oliver corporation. Before engaging in sales work he had been an inspection engineer for the United Alloy Steel Corporation and the Bethlehem Steel Co.

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FRANK N. SPELLER, director of the department of metallurgy and research, National Tube Co., was elected chairman of the metallurgical advisory board for the Carnegie Institute of Technology and the United States Bureau of Mines at a meeting of the board in Pittsburgh, Oct. 19. Mr. Speller, whose term is for three years, succeeds T. D. LYNCH, metallurgist Westinghouse Electric & Mfg. Co., East Pittsburgh.

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CHARLES PACK has resigned as first vice-president and assistant general manager of the Doehler Die-Casting Co., New York, and has established a consulting office at 2720 Woolworth Building, New York.

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LOWELL S. MONROE, formerly advertising manager Electric Controller & Mfg. Co., Cleveland, has joined the engineering staff of the Copperweld Steel Co., Glassport, Pa., and will be in charge of service data.

R. L. AGASSIZ, chairman Calumet & Hecla Consolidated Copper Co., New York, was reelected president of the Copper and Brass Research Association, 25 Broadway, New York, at the annual meeting held Oct. 25.

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GEORGE H. ADAMS has been made director of sales for the Bunting Brass & Bronze Co., Toledo, Ohio. He has had a large and varied experience with the sales and engineering problems of the bearing industries, and prior to his connection with the Bunting company was automotive engineer of the SKF Industries, Inc., New York. He was also chief engineer of the Bock Bearing Co., Toledo.

G. H. ADAMS

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DR. J. T. NORTON, JR., chief chemist Ludlum Steel Co., Watervliet, N. Y., will discuss Nitralloy at the meeting of the Cincinnati chapter of the American Society for Steel Treating on Nov. 1.

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E. S. CARMAN has resigned as secretary and chief engineer of the Osborn Mfg. Co., Cleveland, to establish himself as a consultant on general industrial engineering under the name of Edwin S. Carman, Inc., with offices in Carnegie Hall, Cleveland. He continues to hold a stock interest in the Osborn company, and in his consulting capacity will give special attention to foundry problems.

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WILLIAM D. BLISS, former professor of mechanical engineering at Marquette University, Milwaukee, has been appointed a professor in the mechanical engineering department of the Agricultural and Mechanical College of Texas, College Station, Tex.

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R. J. MCINTOSH has been appointed manager of the steel piling department, Bethlehem Steel Co., in charge of engineering and sales, with offices at Bethlehem, Pa.

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TAYLOR ALLDERDICE, president National Tube Co., Pittsburgh, has been made a director of the Pittsburgh Hotels Corporation.

OBITUARY

WILLARD LAMB VELIE, president of the Velie Motor Corporation and of the Velie Monocoupe Aircraft Corporation, Moline, Ill., died at his home in that city on Oct. 24, following a brief illness. He was born at Moline in 1866, a grandson of John Deere, the founder of the agricultural implement manufacturing company of that name. He attended preparatory school at Andover, Mass., and was graduated from Yale University in 1888. For a time he was associated with Deere & Co., but in 1898, he founded the Velie Carriage Co. and five years later, the Velie Motor Corporation. The aircraft company bearing his name was founded more recently, but the factory had reached a daily capacity of six planes. A son, Willard Lamb Velie, Jr., is active in this branch of the family business.

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ALFRED G. PLACE, chief electrical engineer Youngstown Sheet & Tube Co., Youngstown, died in that city on Oct. 25, following an operation. He was formerly vice-president of the American Institute of Electrical Engineers.

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ROBERT H. CORBETT, chief erecting engineer Nordberg Mfg. Co., Milwaukee, and associated with this industry for more than forty years, died Oct. 16 after an illness of two months. He was born at Springfield, Ill., in 1858, but had lived in Milwaukee since boyhood.

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JOHN E. LONERGAN, head of the John E. Lonergan Co., Philadelphia, founder and machinist, died suddenly at Sacramento, Cal., on Oct. 23, aged 87 years. He was born in Ireland and settled at Philadelphia in 1875, having been actively engaged in business in that city until the time of his death. He had patented several devices now used by the Southern Pacific Railroad. He was also president of the H. Brinton Co. and of the California Vineyards Co.

JAMES A. SMITH, for the last 15 years superintendent of the Schenectady, N. Y., plant, General Electric Co., died Oct. 25, at his home in Schenectady, the victim of a stroke suffered the night before. He was born at Hartford, Conn., May 25, 1873, and in 1888 was employed by the Pratt & Whitney Co., in Hartford, about a year later entering its apprentice shop. He was sent to Chicago to install the Pratt & Whitney exhibit at the World's Fair and, in 1900, was selected to install and demonstrate the company's exhibit at the Paris exposition. From 1901 to 1903 he was associated with the Niles-Bement-Pond Co., and, in 1905, was made superintendent of the Dutchess Tool Works, Fishkill Landing, N. Y., which position he held until he joined the General Electric Co. in 1910. At first he was assistant to the mechanical superintendent at the Schenectady plant and shortly became superintendent of one of the shops. He was appointed general superintendent in July, 1913. He was a member of the company's manufacturing committee and in this capacity was well known in the machine tool and machinery trade.

J. A. SMITH

Considerable Increase in Productive Activity

Productive activity in the United States, estimated by *Electrical World* from monthly electrical energy consumption, is given as 134.5 in September, on a base of 100 as the average in 1923-1925. The latest figure shows a sharp increase from the 120.8 of August and is still further above the 118.4 of a year ago. For the first nine months the average has been 121.6, which represents a gain of more than 5 per cent over the 115.4 recorded for the first nine months of 1927.

In the metal industries group the September advance has been still greater. Both the rolling mills and steel plants and the metal-working plants (ferrous and non-ferrous) showed between 125 and 126 in August. In September, however, the figures are 141.2 for the rolling mill group and 144.2 for the metal-working group. A similar advance is shown for the automobile industry, including parts, which went from 143.2 in August to 161 in September. For the first nine months the average of the metal industries group was 126.5, against 113.1 in the corresponding period of 1927.

Machinery Markets and News of the Works

October Business Fairly Large

Machine Tool Orders in the Month May Equal Those of August and September

MACHINE tool business in October may have equaled that of August or September, and in individual instances the sales of the past month probably exceeded those of September. Some machine tool plants are running at practically full capacity, with occasional night shifts, and a good many of the tool companies have enough orders on their books to carry production at the current rate through the remainder of the year.

Reports from Cincinnati are that fully half of the October business booked by plants in that district came from automobile companies or parts makers. In the Chicago district, tractor manufacturers have contributed a good share of the orders. Railroad buying has not been large, but an improvement is expected in view of larger repair and car-building programs of the principal carriers. The Chicago, Milwaukee, St. Paul & Pacific has placed the final orders on a list totaling about $80,000. Orders are expected soon against the large list of the Norfolk & Western.

The Industrial Rayon Co., which will equip a machine shop at Covington, Va., is inquiring for about 40 tools. The Briggs Mfg. Co., which is reequipping its Cleveland plant for the manufacture of bodies for Ford cars, has bought seven machines of various kinds. The White Motor Co., Cleveland, has begun the purchase of shop equipment for the manufacture of a new type motor.

New York

NEW YORK, Oct. 30.—Prospective business in machine tools continues large, and some sizable purchases have been made in the past week. The E. W. Bliss Co., Brooklyn, has closed on a part of its list of about 50 tools, including a gear cutter, grinder and turret lathes, new, and several items of used equipment. The total of the list may be reduced by the transfer of some tools to the airplane engine plant from other departments. The General Electric Co., Schenectady, continues an active buyer of equipment and has pending two 25-in. lathes and a 4-ft. radial drill. The New York Central has closed recently on two turret lathes, a radial drill, a milling machine and an engine lathe. The Norfolk & Western list is still open.

Niles-Bement-Pond Co., reports sales of 10 engines and bench lathes in the past week. Other sales by this company included a No. 1-A jig boring machine, four No. 2 jig boring machines, No. 4-A universal die sinker, automatic grinder for thread milling cutters, 6 x 120-in. thread milling machine, two 6-in. and one 12-in. vertical shapers, duplex hand centering machine, 40 x 16-ft. planer, 36 to 44-in. side-head boring mill, two No. 108 Ransom grinders, Cincinnati high-speed tapping machine, No. 2 universal grinder, and a 24-in. super-heavy duty shaper.

Bids have been asked by Miller Parlor Frame Co., 266 Maujer Street, Brooklyn, for new two-story plant, to cost about $140,000 with equipment. S. J. Fox, 66 Court Street, is architect.

Sturges Multiple Storage Battery Co., Van Wyck Avenue, Jamaica, L. I., plans rebuilding part of plant destroyed by fire Oct. 22, with considerable loss to building and equipment.

Atlantic Gypsum Products Co., 40 Rector Street, New York, will build a one-story crushing plant with storage and distributing facilities, to cost about $35,000.

Cleveland Container Co., 10630 Berea Road, Cleveland, has leased space in Hoboken Factory Terminal Building, Hoboken, N. J., for new Eastern factory branch and distributing plant. Company recently acquired plant and business of Tulip Container Corporation, Flushing, L. I., which will be removed to new location.

Rizzuto Motor Co., Peekskill, N. Y., has plans for new one-story service, repair and garage building, to cost about $100,000 with equipment. Fletcher-Thompson, Inc., 542 Fairfield Avenue, Bridgeport, Conn., is architect and engineer.

Electric Storage Battery Co., West End Avenue and Sixty-fourth Street, New York, has leased two-story building at 201 West Sixty-fourth Street, and will remove to new location and increase capacity. Headquarters are at Philadelphia.

Charles Pfizer & Co., 11 Bartlett Street, Brooklyn, manufacturers of chemicals, have awarded a general contract to Barney Ahlers Construction Co., 110 West Fortieth Street, New York, for a seven-story factory, to cost $320,000 with equipment.

Dwight P. Robinson & Co., Inc., 125 East Forty-sixth Street, New York, has filed plans for an eight-story automobile service, repair and garage building at 205-13 East Sixty-fourth Street, to cost approximately $500,000 with equipment.

Charles Freshman Co., 240 West Fortieth Street, New York, manufacturer of radio equipment, has leased space at Bush Terminal, South Brooklyn, for expansion in storage and distributing division.

H. E. Magnuson, 420 Lexington Avenue, New York, architect, has plans for a new automobile service, repair and garage building at Brooklyn, to cost about $100,000 with equipment.

Ramapo-Ajax Corporation, Hillburn, N. Y., manufacturer of railroad frogs, switches, etc., is reported planning construction of new plant at Seattle, 100 x 200 ft., to cost over $200,000, for occupancy by its subsidiary, Racor Pacific Frog & Switch Co.

Controlling interest in Fokker Aircraft Corporation, Hasbrouck Heights, N. J., and Wheeling, W. Va., has been acquired by Pacific Coast interests, headed by James A. Talbot, president Richfield Oil Co., Bartlett Building, Los Angeles, and Harris M. Hanshue, president of Western Airways, Inc., same city. Company will be reorganized with capital of about $4,000,000. Plans are under way for expansion in two plants noted and for new plant near Los Angeles to manufacture aircraft of commercial, military and other types. Last noted reported to cost more than $500,000. Anthony G. H. Fokker, heretofore head of company, will remain with new organization as designer and technical expert.

Union Sign Co., 825 East Jersey Avenue, Elizabeth, N. J., is having plans drawn for one-story plant, 50 x 100 ft., on adjoining site, to cost about $25,000 with equipment. Jacob Wind, Jr., 1450 North Broad Street, Hillside, is architect.

Pollak Mfg. Co., Inc., Kearny, N. J., manufacturer of oil and fuel tanks for aircraft, airplane parts, etc., is concluding purchase of plants and businesses of Universal Screw Machine Products Co. and Progress Sheet Metal Works, 541 Devon Street, same place, and will consolidate with organization. Plans are under way for general expansion. Purchasing company is disposing of 400,000 shares of stock for purchases and extensions. Leo L. Pollak is president.

Armour & Co., Union Stock Yards, Chicago, meat packers, are completing plans for new multi-story plant and abattoir at Jersey City, N. J., to cost about $1,000,-

The Crane Market

ACTIVITY in other branches of the machinery business has not yet been reflected in the field of overhead and locomotive cranes. A fair volume of inquiry continues to accumulate including several lists calling for four to six overhead cranes. One of these lists is from the Waterfront Service Co., Brooklyn, N. Y., and asks for bids on six 5-ton, 67-ft. span gantry cranes for installation on a dock. Engineers are Moore & Dunford, 110 East Forty-second Street, New York. Inquiries for locomotive cranes are scattered among contractors and industrial users.

Among recent purchases are:

Lockwood, Greene & Co., engineers, 1 Pershing Square, New York, 15-ton, 31-ft. 11-in. span, 1-motor, overhead crane for Rome, Ga., from Box Crane & Hoist Corporation.

Phoenix Utility Co., 71 Broadway, New York, 60-ton, electric overhead crane for a power station in the West from the Cleveland Crane & Engineering Co.

National Analine & Chemical Co., 40 Rector Street, New York, 15-ton, gasoline operated crawl-tread crane from the McMyler-Interstate Co.

Taylor-Wharton Iron & Steel Co., High Bridge, N. J., 25-ton special design locomotive crane from the Industrial-Brownhoist Corporation.

Miehle Printing Press Co., Chicago, two 3-motor, 10-ton, overhead electric cranes from Milwaukee Electric Crane & Mfg. Corporation.

International Harvester Co., Chicago, three electric cranes for tractor plant from Harnischfeger Corporation.

Chicago, Rock Island & Pacific, Burr Oak, Ill., two 15-ton overhead electric cranes from Harnischfeger Corporation.

000 with machinery. J. D. Andrews is chief engineer for company.

Dalton Tool & Machine Corporation, with executive offices at 8 West Fortieth Street, New York, is now manufacturing at its plant at Bridgeton, N. J., all tools formerly made by Dalton Tool Corporation. Eugene P. Herrman, president, and Edwin H. Jonson, treasurer, are also affiliated with Stewart Steel Products Co., manufacturer of fire alarm apparatus, iron castings and general line of metal products.

Aerial Machine & Tool Corporation, New York, has removed from 79 Grand Street, to larger quarters at 591 Hudson Street.

South Atlantic

BALTIMORE, Oct. 29.—Contract has been let by Crown Cork & Seal Co., 1511 Guilford Avenue, Baltimore, to Consolidated Engineering Co., 20 East Franklin Street, for one, two and four-story addition, 150 x 600 ft., at Highlandtown plant, to cost about $275,000 with equipment. L. R. White, Hearst Tower Building, is architect. Charles E. McManus is president.

Celanese Corporation of America, Inc., Amcelle, near Cumberland, Md., has awarded contract to Hughes-Foulkrod Co., Schaff Building, Philadelphia, for new boiler plant and machinery building at rayon mill, to cost $250,000 with equipment. Other additions are planned to cost about $400,000 with machinery.

Bartgis Brothers Co., Hamburg and Bush Streets, Baltimore, manufacturer of paper board products, has acquired property of Thistle Cotton Mills, Inc., Ilchester, Md., on 90-acre tract, and will remodel for new plant to cost over $200,000 with machinery. Fred L. Smith, 21 East Fortieth Street, New York, paper mill engineer, will prepare plans and place equipment awards.

Chemical Warfare Service, Edgewood Arsenal, Md., is asking bids until Nov. 6 for 27,000 springs, circular 51; until Nov. 5 for 10,000 aluminum die castings, angle tubes, circular 48, and 10,000 flutter valves, circular 47; until Nov. 7 for 6200 sq. ft. wire cloth, circular 50, and 4700 sheets of perforated tin, circular 51.

Carolina Power & Light Co., Raleigh, N. C., has construction under way on new hydroelectric power plant on Pigeon River, near Waterville, N. C., for initial capacity of 67,000 hp. to be increased later to 100,000 hp. Extensions will be made in transmission lines. Entire project will cost more than $800,000. Company is disposing of preferred stock, portion of proceeds to be used for construction and improvements.

McClaren Rubber Co., Charlotte. N. C., will make extensions and improvements in automobile tire plant to increase capacity about 25 per cent. to cost more than $85,000.

General Purchasing Officer, Panama Canal, Washington, is asking bids until Nov. 15 for cable and wire, filing machine, motors, pumps, switches, scoop shovels, cable clips, turnbuckles, wire lath, wire cloth, pipe and pipe fittings, and other kindred products, Panama Schedule 1915.

Southern Lime Products Co. recently organized as subsidiary by S. J. Groves & Sons Co., Cordele, Ga., general contractor, has work under way on new quarrying and crushed stone plant at lime rock properties near city; later second unit will be built. Project is reported to cost more than $40,000.

Plant of Atlanta Plow Works, 1200 Marietta Street, Atlanta, Ga., was damaged by fire on Oct. 18. Losses were confined to forge room and machinery departments. Rebuilding will begin at once.

Philadelphia

PHILADELPHIA, Oct. 29.—Contract has been let by Huck-Gerhardt Co., Inc., Lucerne and G Streets, Philadelphia, to Paul Broz, 2515 West Huntingdon Street, for two-story addition to millwork plant, 51 x 200 ft., to cost about $75,000 with machinery. Clarence E. Wunder, 1520 Locust Street, is architect.

J. L. Langsdorf, Philadelphia, has awarded general contract to Lam Building Co., 1001 Wood Street, for one-story machine shop, to cost about $25,000 with equipment.

Union Battery Co., Phialdelphia, has purchased tract, 335 x 420 ft., heretofore held by Six Wheel Co., as site for new factory, to cost more than $75,000 with equipment.

United States Gypsum Co., 300 West Adams Street, Chicago, has awarded general contract to Morton C. Tuttle Co., 31 St. James Avenue, Boston, engineer and contractor, for new plant at Philadelphia, to manufacture wallboard, building tile, etc.

Arthur L. Shay and James D. Evans, 2055 Washington Avenue, Philadelphia, receivers for Schuylkill Railway Co., Schuylkill Traction Co. and Lakeside Railway Co., will receive bids until Nov. 7 for all or part of electrical machinery, copper and steel, poles and miscellaneous equipment of companies in Schuylkill County.

Atlantic Refining Co., 260 South Broad Street, Philadelphia, has arranged for increase in capital from $70,000,000 to $120,000,000, a portion of fund to be used for general expansion, including oil refinery and pipe line construction in Texas.

Borough Council, Mount Ephraim, N. J., has authorized installation of pumping plant in connection with sewage expansion program to cost about $100,000, for which bids will soon be asked by Remington & Vosbury, 509 Cooper Street, Camden, N. J.

Whiskette Mfg. Co., Terre Hill, Lancaster County, Pa., recently formed by John M. Wenger, Terre Hill, and associates with capital of $25,000, is said to be planning early operation of local plant to manufacture steel wool specialties. R. G. Jolly, 3240 North Thirteenth Street, Philadelphia, and Paul B. Malebranche, 136 East Essex Avenue, Lansdowne, Pa., are interested in new company.

Board of Trustees, Lafayette College, Easton, Pa., has asked bids on general contract for three-story mining engineering building, to be known as John Markle Engineering Hall, to cost more than $200,000 with equipment. C. Z. Klauder, 1429 Walnut Street, Philadelphia, is architect.

John S. Smith, Salisbury, Md., formerly operating Salisbury Shipyard, has taken over idle plant of Seaford Boat Works, Seaford, Del., and will expand. Work will soon begin on one-story unit, 30 x 72 ft.; later new shipways will be built and other construction and repair shops erected. Seaford Chamber of Commerce is interested in project.

Holland Furnace Co., 5154 Catherine Street, Philadelphia, with main plant at Holland, Mich., has leased three-story building at 2721-5 Edgemont Street, for new storage and distributing plant.

E. M. Hanson & Co., 130 North Fourth Street, Philadelphia, have been appointed distributers in Philadelphia territory for chucks, chain hoists and trolleys made by Union Mfg. Co., New Britain, Conn.

Cleveland

CLEVELAND, Oct. 29.—Machine tool business is good and October sales will probably show a gain over September. Orders are plentiful for single machines largely from makers of automotive parts. Quick deliveries are usually desired and some manufacturers are losing orders because they cannot meet these demands. One local manufacturer of

automatic machines cannot promise delivery before February on one size and some other machine tool builders are well filled with orders for the remainder of the year. Manufacturers regard the outlook favorable for a good volume of business until the close of the year.

Briggs Mfg. Co., shut down for some time, and which is re-equipping its Cleveland plant to manufacture bodies for Ford cars, purchased seven machines during the week, including drilling machines, lathes and hack and band saws. Industrial Rayon Corporation, Cleveland, sent out an inquiry for about 40 machines for equpping a machine shop, maintenance department and pattern shop in a new plant it will build at Covington, Va. Machine shop will be used to manufacture special machinery. Inquiry includes three 12 to 36-in. lathes, milling machines, upright and radial drills, pipe machines and hack saws. White Motor Co., Cleveland, which will require additional machinery to manufacture a new type of motor, purchased two multiple-spindle drilling machines the past week.

Some local machine tool plants are operating overtime and report a scarcity of skilled labor.

C. & G. Cooper Co., Mount Vernon, Ohio, has purchased manufacturing department of Hope Engineering Co., Mount Vernon, including plant and engine designs. Cooper company has for some time found it necessary to go outside of Mount Vernon for manufacturing capacity and this acquisition will permit it to further expand its facilities in that city. Hope line of vertical gas engines and compressors will fill out the Cooper line, which has consisted of slow speed horizontal types, chiefly in larger sizes. Hope Engineering Co. hereafter will concentrate more on pipe line and construction end of its business, which has become its major interest.

General Motors Corporation, Detroit, has bought plant and business of Guide Motor Lamp Co., 2130 West 110th Street, Cleveland, at a reported price of $913,690. Plant has been transferred to Delco-Remy Co., a General Motors subsidiary and will be operated with present personnel. H. J. Monson has been president of Guide Company.

Cold Metal Process Co. has moved its equipment from 2318 Logan Avenue, Youngstown, to enlarged quarters in part of plant formerly occupied by Youngstown Boiler & Tank Co., at Mahoning and Glenwood Avenues. Company manufactures shim steel under special patents and will fabricate this metal. L. A. Beeghly, president of Standard Slag Co., Youngstown, and associates, are principal interests in Cold Metal Process Co. which has been in operation for several years. Much of this time its work was experimental, but it is now engaged in commerical production.

Bids will be received by Board of Education, Sixth and Rockwell Streets, Cleveland, until Nov. 12, for one-story foundry for vocational school on Eagle Avenue, to cost $40,000 with equipment. G. M. Hopkinson is school architect.

Goodyear Tire & Rubber Co., Akron, Ohio, is arranging financing for an expansion and improvement program to cost about $10,000,000, including new units at local mills, new tire manufacturing unit in South, and other work.

Cloyes Gear Co., 1614 Collamer Avenue, Cleveland, has awarded general contract to Mitzel Co., Keith Building, for one and two-story units, 32 x 140 ft., to cost over $50,000 with equipment.

Small & Rowley, Terminal Tower Building, Cleveland, architects, have plans for one-story automobile service, repair and garage building to cost $150,000.

Sunlight Electric Mfg. Co., Warren, Ohio, manufacturer of electric motors, etc., has filed plans for two-story plant, 40 x 120 ft., to cost about $40,000 with equipment.

Royal Brass Mfg. Co., 1420 East Forty-third Street, Cleveland, has awarded general contract to Super-Built Construction Co., 1836 Euclid Avenue, for one-story addition, 35 x 130 ft., to cost about $37,000.

Chicago

CHICAGO, Oct. 29.—Most Chicago machine tool dealers report October sales close to, if not exceeding, the best month of the year. Fresh inquiry bulks large, but is more widely scattered than heretofore in the absence of large lists from tractor plants. Agricultural implement manufacturers, however, are not dormant. They are making miscellaneous purchases in good volume and new lists are expected before the end of the year. Punch presses are in active demand and many types of used machine tools are eagerly sought. Some sales are being made for delivery after Jan. 1.

Chicago, Milwaukee, St. Paul & Pacific has closed last items on an $80,000 list and Emerson-Brantingham Co., Rockford, Ill., has also made purchases. International Harvester Co. has ordered some new equipment for its Chicago tractor plant, and a screw machine parts manufacturer has purchased a 14-in. x 6-ft. lathe. Nash Motors Co., Milwaukee, has added an 18-in. lathe to its machine tool equipment.

F. Thomas, 616 East North Street, Decatur, Ill., will build a machine shop addition, 24 x 60 ft.

W. J. Spengler, 2320 Milwaukee Avenue, Chicago, will build a one-story brick machine shop, 50 x 109 ft.

Despatch Oven Co., 116 First Avenue North, Minneapolis, maker of all types of ovens, has plans for new manufacturing building to take care of increased business.

Plans have been filed by Stewart-Warner Speedometer Corporation, 1828 Diversey Parkway, Chicago, for 10-story factory unit, 88 x 103 ft., to cost about $300,000 with equipment.

General Engineering Works, 340 West Huron Street, Chicago, manufacturer of screw machine products, will soon take bids for one-story addition to cost about $85,000 with equipment. Weiss & Niestadt, 53 West Jackson Boulevard, are architects.

Albertson Co., Sioux City, Iowa, manufacturer of automobile tools, etc., has awarded general contract to W. A. Klinger, Inc., Wamoch Building, for four-story and basement unit, 42 x 150 ft., to cost more than $65,000 with equipment.

Allis-Chalmers Mfg. Co., West Allis, Wis., is said to have plans under way for new plant at Springfield, Ill., to manufacture tractors, including parts and assembling divisions, to cost more than $100,000.

Power equipment, conveying and other machinery will be installed in new plant to be built by W. F. Hall Printing Co., 4600 Diversey Avenue, Chicago, to cost more than $600,000.

Minneapolis Threshing Machine Co., Hopkins, Minn., has awarded general contract to C. F. Haglin & Sons Co., National Building, Minneapolis, Minn., for one-story addition, to cost $100,000 with equipment.

Western Harvester Co., subsidiary of Caterpillar Tractor Co., San Leandro, Cal., will establish plant on 75-acre tract at East Peoria, Ill., opposite Caterpillar factory, to manufacture Holt combine harvester and provide for expansion of Caterpillar production. New plant will cost about $1,000,000. Details of construction are now under way.

International Harvester Co. has awarded contract to Priester Construction Co., Davenport, Iowa, for two-story factory unit, 88 x 550 ft., at Rock Island, Ill., to manufacture engines and castings for tractors.

Super-Maid Aluminum Ware Co., Chicago, has purchased plant of Roseland Can & Wire Goods Co., 612 Harrison Avenue, Rockford, Ill., and is transferring equipment to that place. Roseland company will probably establish plant elsewhere. Chicago company operates foundry and two factories in Chicago and Rockford plant is first branch established.

Rockford Pattern Works, 2414 Eleventh Street, Rockford, Ill., maker of wood and metal patterns, has changed name to Rockford Standard Pattern Works, 250 Mill Street, Rockford.

La Salle Aircraft Corporation, Ottawa, Ill., has been organized to manufacture airplanes. Company intends to build plant and has leased local 71-acre tract for airport and factory site. When work begins it will be in market for materials and equipment.

New England

BOSTON, Oct. 29.—The local machine tool market is dull. October sales by dealers in this district will probably fall considerably below those of September, but will run slightly ahead of October, 1927. Manufacturers of metal-working equipment, as a whole, did better this month than in September, and exceeded October, last year.

Inquiry for used equipment is much better than that for new, particularly for presses and other tools the supply of which is limited. Dealers in foundry equipment have had the best month so far this year, molding machines being in especially good demand. Local representatives of manufacturers of such equipment have not only booked a good business in New England but have taken some excellent Canadian orders. Certain types of conveying equipment also have sold well the past month. Mead-Morrison Mfg. Co., East Boston, is well booked on handling equipment for coke manufacturers, and is figuring on a large order for new coke ovens to be built outside of New England.

Warren Telechron Co., Ashland, Mass., has awarded contract for a plant addition. Fay, Spofford & Thorndike, 44 School Street, Boston, are engineers.

Claflin Sumner Coal Co., 32 Pleasant Street, Worcester, Mass., has awarded contract for a scale house and service station. Handling equipment will be purchased. Cutting, Carlton & Cutting, 44 Front St., Worcester, are architects.

Fisk Rubber Co., Chicopee Falls, Mass., has started work on a plant addition.

Brown & Sharpe Mfg. Co., Promenade Street, Providence, R. I., will soon begin work on an addition and alterations to its foundry. Jenks & Ballou, 1035 Grosvenor building, Providence, are engineers.

C. Leslie Weir, 41 East Forty-second Street, New York, will close bids Nov. 5 on a one-story, 125 x 150 ft., ice manufacturing plant at Malden, Mass., for Boston Ice Co., 11 Deerfield Street, Boston.

Derryfield Co., Inc., Manchester, N. H., on Nov. 7 will sell its personal property, including equipment, stock in trade and finished material.

Plans are being drawn by Capital Parlor Frame Co., 470 Tolland Street, East Hartford, Conn., for one-story factory to cost about $50,000 with equipment. G. Zunner Co., 182 High Street, Hartford, is architect.

Bellows Falls Hydro-Electric Corporation, Bellows Falls, Vt., operated by New England Power Association, Worcester, Mass., is disposing of a bond issue of $9,000,000, fund to be used in connection with hydroelectric power development at Bellows Falls and Walpole. Project is estimated to cost $13,000,000, and remainder of fund will be secured through sale of stock issue. Frank D. Comerford is president.

Boston Filter Co., Broadway, Chelsea, Boston, has acquired two-story factory at 43-47 Harvard Square, Charlestown, for new plant.

Atlas Mfg. Co., 125 Water Street, New Haven, Conn., manufacturer of hardware products, wire goods, etc., has acquired Ansonia Novelty Co. Ansonia, Conn., manufacturer of metal specialties and will merge with its organization. Ansonia business will be removed to New Haven, where expansion will be carried out.

Swift & Co., 60 North Market Street, Boston, meat packers, have plans for two-story plant at Malden, Mass., with refrigerating department and other mechanical facilities, to cost about $85,000.

Arthur H. Abbott, Inc., 88 Broad Street, Boston, has been appointed New England district sales agent for Roller-Smith Co., 233 Broadway, New York.

Buffalo

BUFFALO, Oct. 29.—Contract has been let by Precision Die Casting Co., Syracuse, N. Y., to J. D. Taylor, Syracuse, for one-story unit at Cleveland, to cost about $100,000 with equipment.

New York Power & Light Corporation, Johnstown, N. Y., has secured permission to carry out expansion and improvement program at Truxton, Homer, Cortlandville and Fabius and other points, including transmission lines, power substations, etc., to cost $838,000.

H. I. Sackett Electric Co., 251 Pearl Street, Buffalo, electrical equipment and supplies, has acquired a four-story building with about 21,000 sq. ft. of floor space for new storage and distributing plant.

Continental Can Co., Syracuse, N. Y., has authorized increase in capital from 750,000 to 2,000,000 shares of stock, no par value, a portion of fund to be used for expansion.

Curtiss Aeroplane & Motor Co., Kail Street, Buffalo, has awarded general contract to James Stewart & Co., 17 East Forty-second Street, New York, for initial units of new plant at Tonawanda, N. Y. Company has secured contract for quantity of airplanes for Chile totaling about $900,000.

Hickok Mfg. Co., Rochester, N. Y., has purchased five-acre tract at St. Paul and Scranton Streets, and will begin work immediately on new plant. Building will be of one-story, with about 100,000 sq. ft. of floor space. For a time company will use both old plant on State Street and new factory, but later it expects to concentrate manufacturing operations in new plant.

Betson-Jewell, Inc., Rome, N. Y., maker of refractory materials, has been merged with Cyclone Grate Bar Co., Buffalo, and offices of combined company will be located in latter city. Earlier in year machinery of the Betson-Jewell organization was removed from Rome to North Bend, Ind. Frank J. Jewell, president of Rome company, will continue to represent company in home territory in a sales capacity, but has severed his connection as manager.

Niagara Sprayer & Chemical Co., Inc., Middleport, N. Y., has been organized to take over properties and business of Niagara Sprayer Co. and affiliated company, Niagara Chemical Co., Inc. Business will be continued without essential changes in personnel or policy. Company also has plants at San Francisco, Jacksonville, Fla., and Burlington, Ont.

Cincinnati

CINCINNATI, Oct. 29.—Machine tool sales the past week have deviated little from the level maintained in the early part of October, and from the standpoint of fresh orders the month is assured of a place alongside August and September. There are individual instances of decreased bookings in the past 30 days, but in great measure these are offset by an equal number of companies which this month are bettering their September record. It is safe to say that approximately 50 per cent of the business booked in the last two months has originated in the automobile industry.

While a slight slackening in sales is anticipated in the immediate future, as a natural consequence of recent heavy buying, machine tool builders are of the opinion that business will continue good during the remainder of the year. Meanwhile, production shows no signs of falling off and the volume of unfilled orders precludes such a possibility in the next month.

Contract has been let by Delco-Remy Corporation, First and Madison Streets, Dayton, Ohio, to Hillsmith & Co., Dayton, for one-story addition, 75 x 120 ft., to cost about $50,000 with equipment. Company contemplates new seven-story unit to cost about $200,000 and will soon have plans drawn.

City Council, Troy, Ohio, George L. Smith, service director, plans addition to municipal electric light and power plant to double present capacity, including installation of turbine unit and auxiliary equipment, to cost about $85,000.

Board of Education, Hamilton, Ohio, contemplates installation of manual training equipment in new two-story junior high school, to cost about $500,000. F. J. Mueller, Rentschler Building, is architect.

H. Blockman & Co., 376 North Front Street, Memphis, Tenn., paper goods, plan new four-story storage and distributing plant, to cost more than $80,000 with handling and other equipment.

Smith-Mills Coal Mines Co., Henderson, Ky., plans rebuilding part of tipple and boiler plant recently destroyed by fire.

Air Corps, Material Division, Wright Field, Dayton, Ohio, will receive bids until Nov. 6 for one universal bench saw, rip, cut-off, and miter, with motor drive, circular 168; 50 field instrument testing frames, circular 157; until Nov. 7 for 2000 connecting rod bearing and cap assemblies, circular 170; until Nov. 12 for aircraft supplies including extension assemblies, cowling assemblies, radiators, pulleys, fasteners, bolts, windshield assemblies, etc., circular 147.

W. L. Smith, head of Jefferson Investment Co., Exchange Building, Memphis, Tenn., and associates plan automobile service, repair and garage building, 150 x 156 ft., to cost more than $100,000 including tools and equipment.

Johnson Flying Service, Dayton Airport, Vandalia, Dayton, Ohio, E. A. Johnson, president, plans construction of new hangar with repair facilities.

Jones Sand Co., 277 East Long Street, Columbus, Ohio, steel molding sand, has changed its name to Industrial Minerals Co.

Detroit

DETROIT, Oct. 29.—Contract has been let by Frost Gear & Forge Co., South Horton Street, Jackson, Mich., to North-Moller Co., local, for one-story addition, 100 x 160 ft., with extension, 50 x 100 ft., to cost about $110,000 with equipment.

Michigan Steel Tube Products Co., Holbrook and Buffalo Streets, Detroit, manufacturer of electric-welded tubing, has engaged Christian W. Brandt, Kresge Building, architect and engineer, to prepare plans for an addition, to cost about $300,000 with equipment.

Ajax Bolt & Screw Co., 6623 Gratiot Avenue, Detroit, will rebuild part of plant destroyed by fire Oct. 22, with loss reported over $300,000 including equipment.

Cadillac Sales & Service Co., 121 Wayne Street, Pontiac, Mich., will ask bids in about 60 days for new four-story service, repair and sales building, to cost about $130,000 with equipment. Fisher Brothers, 24 West Huron Street, are architects.

Monnier Brothers & Co., Algonac, Mich., manufacturers of boat hoists, etc., plan new unit to cost more than $40,000 including equipment. It is understood that present works will be removed to new location and capacity increased.

Murray Body Corporation, Russell and Aberle Streets, Detroit, is arranging for increase in capital from 300,000 to 900,000 shares of stock, no par value, a portion of proceeds to be used for expansion.

Erb Joyce Foundry Co., Vassar, Mich., has plans for one-story foundry addition, to cost more than $40,000 with equipment.

American Ship Building Co., Detroit, has placed its local plant on market, consisting of 15 acres at foot of Orleans Street, on Detroit River, previously known as Detroit Drydock & Engine Works. Company will concentrate operations in future at shipyards at Lorain and Cleveland, Ohio, where increased output will be developed. W. H. Gerhauser is president.

Michigan Steel Corporation, Ecorse, Mich., is disposing of bond issue of $1,250,000, a portion of fund to be used for expansion. George R. Fink is president.

Briggs Mfg. Co., 11631 Mack Avenue, Detroit, manufacturer of automobile bodies, has asked bids on general contract for two and three-story addition, 550 x 700 ft., to cost more than $450,000 with equipment. Albert Kahn, Inc., Marquette Building, is architect and engineer.

Federal Screw Works, 3401 Martin Street, Detroit, has acquired plant and business of Chelsea Screw Co., Chelsea, Mich. Purchased property will be known

as Chelsea Division, with operations in charge of M. J. Dunkel, heretofore president of company, who will continue as vice-president of such division.

Russel Wheel & Foundry Co., Detroit, engaged in fabrication and erection of steel structures and in heavy machine work, has changed name to Russel Steel Construction Co.

Pittsburgh

PITTSBURGH, Oct. 29.—A well sustained demand is commonly reported by machine tool dealers, most of whom find sales to be small individually, but fairly numerous. As yet the Westinghouse Electric & Mfg. Co. has bought only a few of the items in its fourth quarter list.

J. C. and Christ Rieger, Fulton Building, Pittsburgh, architects, have plans for three-story automobile service, repair and garage building at Turtle Creek, Pa., to cost about $85,000 with equipment.

United States Engineer Office, Pittsburgh, will soon take bids for river improvements in local district to cost more than $1,000,000, including emergency dam, lock-operating machinery, power plant equipment for Deadmans Island fixed dam. Bids will be asked in about 60 days for lock buildings, including power station and other machinery.

West Virginia Hydro-Electric Co., Charlottesville, Va., is planning construction of hydroelectric power station on New River, near Hinton, W. Va., to cost over $400,000.

In connection with expansion program at New Kensington, Pa., Aluminum Co. of America, Inc., is also considering additions in frabricating plant, to cost $500,000 with machinery, not included in main program.

Board of Public Education, Forbes and Bellefield Streets, Pittsburgh, is asking bids until Nov. 8 for machine shop equipment for Liberty junior high school, woodworking machinery for Osceola school; drafting tables for South Hill high school, cast iron boilers, etc.; specifications at office of George W. Gerwig, secretary.

J. I. Thomas, Lewistown, Pa., is establishing a new plant at South Juniata and West Charles Streets, Hollywood district, to manufacture sheet metal products, brass and copper specialties, etc.

St. Louis

ST. LOUIS, Oct. 29.—Contract has been let by Meeker Advertising Co., Third and Michigan Streets, Joplin, Mo., manufacturer of advertising novelties, etc., to Albert Woods, 2802 Joplin Street, for new unit to cost about $100,000 with equipment.

Board of Public Service, St. Louis, will receive bids until Nov. 20 for 10-ton electric box crane for municipal fire department.

American Eagle Aircraft Corporation, 2330 Harrison Street, Kansas City, Mo., is disposing of a stock issue of $675,500 for expansion, including new plant at Fairfax airport, Kansas City, Kan. Crescent Propeller Co., a subsidiary, will also increase output for manufacture of propellers for Eagle aircraft, as well as other specialties.

Chamber of Commerce, Norman, Okla., is at head of project to construct and operate municipal airport, including hangars, repair shops and other units, to cost about $50,000.

Corona Silica, Inc., care of H. R. McKnight, Tulsa, Okla., president, recently formed by Mr. McKnight and associates with capital of $750,000, plans development of silica properties near Rogers, Ark., including construction of grinding and refining mill. Project will cost over $400,000.

E. J. Rodda Motor Co., 200 South Lawrence Street, Wichita, Kan., is having plans drawn for new service, repair and garage building, to cost about $145,000 with equipment. S. S. Voight, 524 South Lawrence Street, is architect.

Sinclair Pipe Line Co., Sinclair Building, Tulsa, Okla., has plans for one-story and basement machine shop to cost about $20,000 with equipment; company also plans similar unit at Drumright, Okla., to cost approximately like sum. Work will soon begin on 10 pumping plants for pipe line from Tulsa district to Chicago, to cost about $200,000 with equipment.

American Foundry & Mfg. Co., Ninth and Wright Streets, St. Louis, will rebuild part of plant unit destroyed by fire Oct. 20.

Board of Education, St. Louis, has authorized call for bids for five-story vocational high school at Grand Boulevard and Windsor Place, to cost about $3,000,000 with equipment. R. M. Milligan is commissioner of school buildings in charge.

Missouri Carriage Works, Inc., 1915 Broadway, Kansas City, Mo., has awarded general contract to Morley Brothers, Dwight Building, for two-story addition to cost about $40,000 with equipment. Hans Von Unwerth, Finance Building, is architect and engineer.

Gulf States

BIRMINGHAM, Oct. 29.—Contract has been let by Wackman Welded Ware Co. of Texas, Inc., Sawyer Street, Houston, Tex., to Forrest W. McNeir, 2603 Chartres Street, for one-story plant, 92 x 200 ft., to cost about $55,000 with equipment. Headquarters are at Seventh and Victor Streets, St. Louis.

Dallas Power & Light Co., Dallas, Tex., has authorized expansion and improvement program to increase capacity about 50 per cent, and to cost about $2,750,000.

American Battery Products Corporation, Wichita Falls, Tex., C. V. Chermendy, head, is contemplating new plant to cost about $50,000 with equipment.

Asiatic Petroleum Co., Ltd., 65 Broadway, New York, is completing plans for storage and distributing plant on 60-acre tract at Port Tampa, Fla., including pumping plant and power station, to cost more than $100,000 with equipment.

City Council, Waco, Tex., plans municipal airport on 200-acre tract, including hangars, repair and reconditioning shops and other units, for which appropriation of $75,000 has been approved. E. E. McAdams is city manager.

Shell Pipe Line Co., affiliated with Roxana Petroleum Co., Shell Building, St. Louis, plans construction of new pipe line from McCamey, Tex., to new refinery on ship channel near Houston, Tex., to cost more than $1,000,000. A storage and distributing plant will be built at McCamey, with steel tanks of 80,000-bbl. capacity, pumping stations and auxiliary equipment.

Linde Air Products Co., 30 East Forty-second Street, New York, and 504 Dolorosa Street, San Antonio, Tex., has awarded contract to Sumner-Sollitt Co., San Antonio, for one-story plant on Cassiano Street, to cost about $40,000 with equipment.

City Council, Brownsville, Tex., plans extensions and improvements in municipal electric light and power plant and waterworks, with installation of additional equipment, to cost $150,000, for which bonds will be issued.

Texas Co., Texas Building, Houston, Tex., has acquired property at San Antonio, Tex., for new oil refinery, and will carry out project in connection with similar plant on site recently purchased at El Paso, Tex. Plants are reported to cost about $1,500,000, including pipe line construction, and are scheduled for completion next summer. A third refinery at Amarillo, Tex., with rating of 90,000 bbl. a month, is also planned.

National Portland Cement Co., Houston, Tex., care of C. S. Atkinson, 3406 La Branch Street, secretary and treasurer, recently organized with capital of $250,000, plans operation of local works to manufacture special white cements. It has acquired plant and business of Gates Chemical Co., Mary and North San Jacinto Streets, and will operate as unit.

Aransas Compress Co., Corpus Christi, Tex., plans construction of third unit to cotton compress plant to cost about $140,000.

Carlos B. Schoeppl, Consolidated Building, Jacksonville, Fla., architect, is completing plans for automobile service, repair and garage building, to cost about $145,000 with equipment.

Indiana

INDIANAPOLIS, Oct. 29.—Acme Tool & Machine Co., 924 Fort Wayne Avenue, Indianapolis, has awarded general contract to Leroy Wakefield, 5805 Morris Street, for one-story machine shop, 40 x 115 ft., to cost about $25,000.

City Council, Columbia City, has awarded general contract to G. A. Walters, Columbia City, for municipal power plant, to cost about $50,000 with equipment.

Commercial Testing & Engineering Co., 37 West Van Buren Street, Chicago, engineer, has plans for two-story addition to boiler plant at Progress Laundry, 428 East Market Street, Indianapolis, to cost about $30,000.

V. L. Wright, Anderson, and associates are organizing company to establish plant to manufacture aircraft motors, of radial air-cooled, five-cylinder type, 100 and 159 hp. D. J. DesChamps will be engineer, in charge of production.

Klieber-Dawson Machine Co., 316 North State Street, Indianapolis, has awarded general contract to Austin Co., Cleveland, for one-story machine shop, to cost about $30,000 with equipment.

New Jersey, Indiana & Illinois Railway Co., 1508 West Division Street, South Bend, has awarded general contract to John Nelson Co., Monroe Building, for new engine terminal, with engine house, repair shop, etc., to cost about $50,000.

Crown Machine Co., 4301 Newton Avenue, Indianapolis, has filed plans for one-story machine shop, 54 x 140 ft., to cost about $28,000 with equipment.

Pacific Coast

SAN FRANCISCO, Oct. 24.—General Petroleum Corporation of California, Higgins Building, Los Angeles, is completing plans for first two units of new oil refinery at Hermosa Beach, near Los Angeles, where 1000-acre site is available. Plant will have initial capacity for handling 30,000 bbl. per day, with storage and distributing facilities of 1,200,000 bbl., to cost about $2,000,000.

Standard Pipe & Supply Co. 4437 Santa Fe Avenue Los Angeles has awarded general contract to John Flick, 6820 Seville Avenue, Huntington Park, for one-story storage and distributing plant, 50 x 240 ft., to cost over $50,000 with equipment.

San Francisco Aircraft Specialties Corporation, San Francisco, care of J. R. Gilbert, 408 Warren Road, San Mateo, Cal., recently formed by Mr. Gilbert and associates, is planning new works for airplane production, including parts production and assembling, to cost about $60,000 with equipment.

Pacific Gas & Electric Co., 245 Market Street, San Francisco, has plans for new equipment storage and distributing plant in Mission district, including repair department, to cost about $100,000 with equipment. Engineering department of company is in charge.

Reed Roller Bit Co., 1317 Esperanza Street, Los Angeles, has awarded contract to Union iron Works, 5125 Santa Fe Avenue, for addition to machine shop.

State Highway Commission, Sacramento, Cal., is considering new eqipment maintenance and repair shops near Eureka, Cal., to cost more than $75,000 with equipment. G. B. McDougal, Sacramento, is State architect.

Puget Sound Glass Co., Anacortes, Wash., is said to be planning new plant at Seattle, to cost more than $200,000 with machinery. W. H. Nichols is president.

Pacific Coast Cement Co., 3801 East Marginal Way, Seattle, has awarded general contract to Pacific Coast Engineering Co., Seattle, for one-story addition to cost $175,000; also contract to MacDonald Engineering Co., Seattle, for addition to storage and distributing plant to cost approximately $75,000.

Power and refrigerating machinery, conveying and other equipment will be installed in one and two-story and basement plant, 125 x 140 ft., of Rocky Mountain Packing Corporation, Murray, Utah, to cost $200,000.

Kay Steel Co., Alhambra, Cal., is completing plans for one-story unit, 80 x 240 ft., to cost over $60,000 with equipment; a crane runway will be installed. Emmett G. Martin, Chester Williams Building, Los Angeles, is architect.

Norman S. Wright, with offices at San Francisco, Los Angeles and Seattle, has been appointed Pacific Coast agent for products of Bayonne Bolt Corporation, 117 Liberty Street, New York.

Canada

TORONTO, Oct. 29.—Machine tool sales hold at a good level with a steady flow of one or two unit orders from diversified sections. Both dealers and builders report good orders from automobile manufacturing districts, garages and repair shops. Second-hand and rebuilt tools are moving freely. Small tools also are in good demand.

Plant of Rideau Power Co., Merrickville, Ont., was damaged by fire to extent of $80,000. Equipment was almost a total loss. It is planned to rebuild immediately.

Board of Water Commissioners, Oshawa, Ont., has instructed city engineer, W. C. Smith, to obtain prices on installation of a complete auxiliary pump for city pumping station.

Avon River Power Co., Windsor, N. S., having acquired Stewiacke Electric Light & Power Co., Ltd., plans construction of a plant at Falls River, N. S., to supply power to municipalities in district. With transmission lines it will cost about $160,000.

Norton Co. of Canada, Ltd., 3 Beach Road, Hamilton, Ont., manufacturer of grinding wheels, etc., has awarded contract to W. H. Cooper, 6 Hughson Street, North, for an addition to cost $25,000.

Firth Brothers, 144 James Street North, Hamilton, Ont., is erecting a four-story and basement plant, 84 x 149 ft., to cost $250,000. John Poag & Son, 9 Westinghouse Avenue, has general contract. A number of sub-trades have been let.

City Engineer's Department, Montreal, is preparing plans for a power plant to cost about $100,000. H. A. Terreault is engineer.

Western Canada

Restmore Mfg. Co., Ltd., 1000 Parker Street, Vancouver, B. C., manufacturer of woven wire springs, furniture, has awarded contract to E. J. Ryan Contracting Co., for four-story addition, 33 x 260 ft., to cost $25,000. J. E. McKenzie, 5 Fairfield Building, is architect.

Barrett Roofing Co., foot of Oak Street, Point Grey, B. C., has awarded contract to Dominion Construction Co., for one and one-half story addition, 50 x 75 ft.

Regal Oil Refining Co., Ltd., Calgary, Alta., has awarded contract to Foster Construction Co., 918 Eighth Avenue West, for one-story oil refinery, 42 x 60 ft., and pump house, 18 x 24 ft.

Foreign

PLANS are being arranged by Lysaghts, Ltd., Newcastle, Australia, for expansion and improvements in iron and steel mills, including new buildings, to double present capacity.

Administracion General de Las Usinas Electricas del Estado, Canelones, Uruguay, has completed plans for new electric power plant at Montevideo to cost about 3,000,000 pesos (about $3,060,000), and will take bids soon on general contract.

South African Railways, Johannesburg, are asking bids until Nov. 15 for one overhead runway system for new cargo shed.

L. & N. Brown Coal Co., Ltd., London, England, subsidiary of Sensible Heat Distillation, Ltd., same city, has arranged with Australian Shale Corporation, Hobart, Tasmania, for new coal carbonization plant in Tasmania, with capacity for handling 100 tons of coal per day. Plant will be operated by Australian company under direction of Brown Coal company.

A phosphate manufacturing company at Dunedin, New Zealand, has approved plans for expansion and improvements, including modernization of present works, and has arranged fund of about £120,000 (approximately $600,000) for project, including new equipment.

Council, Wellington, New Zealand, is asking bids until Dec. 3 for one plate bending machine.

Ruhr Gas Co., Essen, Germany, is planning construction of pipe lines from Ruhr coal fields to distant and neighboring centers, including line to Hanover, about 125 miles, latter to cost more than $2,000,000 with compressor plants. Company is arranging for sale of bonds totaling $10,000,000, large part of fund to be used for program.

National Aeronautical Research Laboratory of City of Berlin, Germany, has plans for new airport in vicinity of Tempelhof, consisting of hangars for commercial and research planes, machine and repair shops, testing laboratories, oil storage and distributing buildings and other units, to cost about $250,000. Three similar airports are planned in other districts, one at former Zeppelin field at Staaken, to include training schools and aircraft production facilities.

New Trade Publications

Surge Tanks.—Chicago Bridge & Iron Works, 37 West Van Buren Street, Chicago. Booklet of 20 pages illustrating and describing Johnson differential surge tanks for hydraulic power plant regulation. The pamphlet sets forth advantages following the use of such equipment, compares different types and illustrates such tanks located in many parts of the country.

Nickel Steel.—International Nickel Co., New York. Pamphlet No. 12 on nickel steel and its applications is entitled "Alloy Steel for Boiler Construction." It is reprint of a paper by Charles McKnight of that company, delivered at the semi-annual meeting of the American Society for Steel Treating at Montreal, Canada, in February, 1928.

Heat Treatment.—Stanley P. Rockwell Co., Hartford, Conn. Bulletin No. 2808 discusses the importance of time control in heat treatment where distortion is detrimental.

Tramrails.—Cleveland Electric Tramrail Division, Cleveland Crane & Engineering Co., Wickliffe. Catalog No. 4, describing and illustrating completely for the first time the company's standardized overhead conveying equipment. The design of the tramrail rails is described, together with illustrations of installations. Also covered are hand-propelled carriers operating on tramrails, rack carriers to operate on tramrail systems, tramrail systems for molding machines, and sand riddles, chain hoist carriers, furnace chargers, gantry and jib cranes, transfer bridges and various accessories.

Measuring Labor Operations.—Haynes Corporation, First National Bank Building, Chicago. Pamphlet of 56 pages devoted to the Manit system of measuring labor and comparing its efficiency, man by man, operation by operation, or department by department. The system is said to have been in use for six years and to provide economies and added information regarding the progress of the business.

Valves.—Merco Nordstrom Valve Co., Engineers Building, Cleveland. Catalog No. 6 of 142 pages illustrates and describes Nordstrom valves, which are of the plug-cock type, lubricated. A wide variety of patterns is shown, with dimensions for the different sizes under each type. Elevations and plans supplement the halftones, while there are a number of sectional views.

Compressors.—Chicago Pneumatic Tool Co., 6 East Forty-fourth Street, New York. Four bulletins devoted to compressors of various types. No. 700 of 24 pages illustrates and describes duplex air compressors driven by power, giving details of construction as well as installation views. No. 720 of 24 pages illustrates and describes straight-line air and gas compressors driven by steam or other power. No. 786 of eight pages covers vertical duplex compressors, and No. 788 of eight pages covers vertical simplex air compressors.

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